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A Presidential Address

Delivered at the Meeting at Belfast, on Sept. 10th, 1902, of the British Association for the Advancement of Science.

BY JAMES DEWAR, F.R.S., F.C.S.,

JACKSONIAN PROFESSOR OF EXPERIMENTAL PHILOSOPHY, CAMBRIDGE UNIVERSITY; FULLERIAN PROFESSOR OF CHEMISTRY, ROYAL INSTITUTION, LONDON.

PROFESSOR DEWAR commenced his address with an appropriate reference to King Edward's happy restoration to health. He then paid a sympathetic tribute to the memory of three members of the Association deceased since the last meeting—namely, Mr. George Griffith, Sir Joseph Gilbert, and Professor Alfred Cornu of Paris. In the next place he drew attention to the prominent position held by Belfast as one of the great cities of the United Kingdom and reviewed some points of the presidential address delivered by Professor Tyndall at the meeting of the Association in Belfast 28 years before. He then made some remarks on the endowment of education with especial reference (1) to the benefactions due to Mr. Cecil Rhodes and Mr. Andrew Carnegie; and (2) to the financial aspect of the work done at the Royal Institution in Albemarle-street, London. He had obtained from the books accurate statistics of the total expenditure on experimental inquiry and public demonstrations at the Royal Institution for 100 years—i.e., for the whole of the nineteenth century—and he had found that the total outlay was £119,800, or an average of £1200 per annum, which was not a large sum considering that this period included the achievements of Young, Davy, Faraday, and Tyndall. He then briefly discussed the causes of the rapid growth in Germany of trades and industries connected with chemistry, after which he continued as follows:—

HISTORY OF COLD AND THE ABSOLUTE ZERO.

Science is advancing in so broad a front by the efforts of so great an army of workers that it would be idle to attempt within the limits of an address to the most indulgent of audiences anything like a survey of chemistry alone. But I have thought it might be instructive, and perhaps not uninteresting, to trace briefly in broad outline the development of that branch of study with which my own labours have been recently more intimately connected—a study which I trust I am not too partial in thinking is as full of philosophical interest as of experimental difficulty. The nature of heat and cold must have engaged thinking men from the very earliest dawn of speculation upon the external world; but it will suffice for the present purpose if we take up the subject where it stood after the great revival of learning and as it was regarded by the father of the inductive method. That this was an especially attractive subject to Bacon is evident from the frequency with which he recurs to it in his different works, always with lamentation over the inadequacy of the means at disposal for obtaining a considerable degree of cold. Thus in the chapter in the Natural History, "Sylva Sylvarum," entitled "Experiments in Consort touching the Production of Cold," he says: "The production of cold is a thing very worthy of the inquisition both for the use and the disclosure of causes. For heat and cold are nature's two hands whereby she chiefly worketh, and heat we have in readiness in respect of the fire, but for cold we must stay till it cometh or seek it in deep caves or high mountains and when all is done we cannot obtain it in any great degree, for furnaces of fire are far hotter than a summer sun, but vaults and hills are not much colder than a winter's frost." The great Robert Boyle was the first experimentalist who followed up Bacon's suggestions. In 1682 Boyle read a paper to the Royal Society on New Experiments and Observations touching Cold or an Experimental History of Cold, published two years later in a separate work. This is really a most complete history of everything known about cold up to that date, but its great merit is the inclusion of numerous experiments made by Boyle himself on frigorific mixtures and the general effects of such upon matter. The agency chiefly used by Boyle in the conduct of his experiments was the glaciating mixture of snow or ice and salt. In the course of his experiments he made many important observations. Thus he observed that the salts which did not help the snow or ice to dissolve faster gave no effective freezing and he showed that water in becoming ice expands by about one-ninth of its volume and bursts gun-barrels. The greatest degree of cold that Boyle was able to produce did not make air exposed to its action lose a full tenth of its own volume, so that, in his own words, the cold does not "weaken the spring by anything near so considerable as one would expect." After making this remarkable observation and commenting upon its unexpected nature it is strange that he did not follow it up. After the masterly essay of Boyle the attention of investigators was chiefly directed to improving thermometrical instruments. The old air thermometer of Galileo being inconvenient to use, the introduction of fluid thermometers greatly aided the inquiry into the action of heat and cold. For a time great difficulty was encountered in selecting proper fixed points on the scales of such instruments and this stimulated men like Huyghens, Newton, Hooke, and Amontons to suggest remedies and to conduct experiments. By the beginning of the eighteenth century the freezing-point and the boiling-point of water were agreed upon as fixed points, and the only apparent difficulties to be overcome were the selection of the fluid, accurate calibration of the capillary tube of the thermometer, and a general understanding as to scale divisions. It must be confessed that great confusion and inaccuracy in temperature observations arose from the variety and crudeness of the instruments. This led Amontons in 1702-03 to contribute two papers to the French Academy which reveal great originality in the handling of the subject and which, strange to say, are not generally known. The first discourse deals with some new properties of the air and the means of accurately ascertaining the temperature in any climate. He regarded heat as due to a movement of the particles of bodies, though he did not in any way specify the nature of the motion involved, and as the general cause of all terrestrial motion, so that in its absence the earth would be without movement in its smallest parts. The new facts he records are observations on the spring or pressure of air brought about by the action of heat. He shows that different masses of air, measured at the same initial spring or pressure, when heated to the boiling-point of water, acquire equal increments of spring or pressure, provided the volume of the gas be kept at its initial value. Further, he proves that if the pressure of the gas before heating be doubled or tripled, then the additional spring or pressure resulting from heating to the boiling-point of water is equally doubled or tripled. In other words, the ratio of the total spring of air at two definite and steady temperatures and at constant volume is a constant, independent of the mass or the initial pressure of the air in the thermometer. These results led to the increased perfection of the air thermometer as a standard instrument, Amontons' idea being to express the temperature at any locality in fractions of the degree of heat of boiling water. The great novelty of the instrument is that temperature is defined by the measurement of the length of a column of mercury. In passing, he remarks that we do not know the extreme of heat and cold, but that he has given the results of experiments which establish correspondences for those who wish to consider the subject. In the following year Amontons contributed to the Academy a further paper extending the scope of the inquiry. He there pointed out more explicitly that as the degrees of heat in his thermometer are registered by the height of a column of mercury, which the heat is able to sustain by the spring of the air, it follows that the extreme cold of the thermometer will be that which reduces the air to have no power of spring. This, he says, will be a much greater cold than what we call "very cold," because experiments have shown that if the spring of the air at boiling-point is 73 inches, the degree of heat which remains in the air when brought to the freezing-point of water is still very great, for it can still maintain the spring of 51½ inches. The greatest climatic cold on the scale of units adopted by Amontons is marked 50, and the greatest summer heat 58, the value for boiling water being 73, and the zero being 52 units below the freezing-point. Thus Amontons was the first to recognise that the use of air as a thermometric substance led to the inference of the existence of a zero of temperature, and his scale is nothing else than the absolute one we are now so familiar with. It results from Amontons' experiments that the air would have no spring left if it were cooled below the freezing-point of water to about two and a half times the temperature range which separates the boiling-point and the freezing-point.

In other words, if we adopt the usual centennial difference between these two points of temperature as 100° then the zero of Amontons' air thermometer is *minus* 240°. This is a remarkable approximation to our modern value for the same point of *minus* 273°. It has to be confessed that Amontons' valuable contributions to knowledge met with that fate which has so often for a time overtaken the work of too advanced discoverers; in other words, it was simply ignored, or in any case not appreciated, by the scientific world either of that time or half a century later. It is not till Lambert, in his work on "Pyrometrie," published in 1779, repeated Amontons' experiments and endorsed his results that we find any further reference to the absolute scale or the zero of temperature. Lambert's observations were made with the greatest care and refinement and resulted in correcting the value of the zero of the air scale to *minus* 270° as compared with Amontons *minus* 240°. Lambert points out that the degree of temperature which is equal to zero is what one may call absolute cold, and that at this temperature the volume of air would be practically nothing. In other words, the particles of the air would fall together and touch each other and become dense like water; and from this it may be inferred that the gaseous condition is caused by heat. Lambert says that Amontons' discoveries had found few adherents because they were too beautiful and advanced for the time in which he lived.

About this time a remarkable observation was made by Professor Braun at Moscow who, during the severe winter of 1759, succeeded in freezing mercury by the use of a mixture of snow and nitric acid. When we remember that mercury was regarded as quite a peculiar substance possessed of the essential quality of fluidity we can easily understand the universal interest created by the experiment of Braun. This was accentuated by the observations he made on the temperature given by the mercury thermometer, which appeared to record a temperature as low as *minus* 200° C. The experiments were soon repeated by Hutchins at Hudson's Bay who conducted his work with the aid of suggestions given him by Cavendish and Black. The result of the new observations was to show that the freezing-point of mercury is only *minus* 40° C., the errors in former experiments having been due to the great contraction of the mercury in the thermometer in passing into the solid state. From this it followed that the enormous natural and artificial colds which had generally been believed in had no proved existence. Still, the possible existence of a zero of temperature very different from that deduced from gas thermometry had the support of such distinguished names as those of Laplace and Lavoisier. In their great memoir on "Heat," after making what they consider reasonable hypotheses as to the relation between specific heat and total heat, they calculate values for the zero which range from 1500° to 3000° below melting ice. On the whole, they regard the absolute zero as being in any case 600° below the freezing-point. Lavoisier in his "Elements of Chemistry," published in 1792, goes further in the direction of indefinitely lowering the zero of temperature when he says: "We are still very far from being able to produce the degree of absolute cold, or total deprivation of heat, being unacquainted with any degree of coldness which we cannot suppose capable of still further augmentation." Even as late as the beginning of the nineteenth century we find Dalton, in his "New System of Chemical Philosophy," giving 10 calculations of this value and adopting finally as the natural zero of temperature *minus* 3000° C.

In Black's lectures we find that he takes a very cautious view with regard to the zero of temperature, but as usual is admirably clear with regard to its exposition. Thus he says: "We are ignorant of the lowest possible degree or beginning of heat. Some ingenious attempts have been made to estimate what it may be, but they have not proved satisfactory. Our knowledge of the degrees of heat may be compared to what we should have of a chain the two ends of which were hidden from us and the middle only exposed to our view. We might put distinct marks on some of the links and number the rest according as they are nearest to, or further removed from, the principal links; but not knowing the distance of any links from the end of the chain we could not compare them together with respect to the distance or say that one link was twice as far from the end of the chain as another." It is interesting to observe, however, that Black was evidently well acquainted with the work of Amontons and strongly supports his inference as to the nature of air. Thus, in discussing the general cause of vaporisation Black says that some philosophers have adopted the view "that every palpable elastic fluid in nature is produced and preserved in this form by the action of heat. Mr. Amontons, an ingenious member of the late Royal Academy of Sciences, at Paris, was the first who proposed this idea with respect to the atmosphere. He supposed that it might be deprived of the whole of its elasticity and condensed and even frozen into a solid matter were it in our power to apply to it a sufficient cold; that it is a substance that differs from others by being incomparably more volatile, and which is therefore converted into vapour and preserved in that form by a weaker heat than any that ever happened or can obtain in this globe, and which, therefore, cannot appear under any other form than the one it now wears, so long as the constitution of the world remains the same as at present." The views that Black attributes to Amontons have been generally associated with the name of Lavoisier who practically admitted similar possibilities as to the nature of air; but it is not likely that in such matters Black would commit any mistake as to the real author of a particular idea, especially in his own department of knowledge. Black's own special contribution to low-temperature studies was his explanation of the interaction of mixtures of ice with salts and acids by applying the doctrine of the latent heat of fluidity of ice to account for the frigorific effect. In a similar way Black explained the origin of the cold produced in Cullen's remarkable experiment of the evaporation of ether under the receiver of an air-pump by pointing out that the latent heat of evaporisation in this case necessitated such a result. Thus, by applying his own discoveries of latent heat, Black gave an intelligent explanation of the cause of all the low-temperature phenomena known in his day.

After the gaseous laws had been definitely formulated by Gay-Lussac and Dalton the question of the absolute zero of temperature, as deduced from the properties of gases, was revised by Clement and Desormes. These distinguished investigators presented a paper on the subject to the French Academy in 1812 which it appears was rejected by that body. The authors subsequently elected to publish it in 1819. Relying on what we know now to have been a faulty hypothesis they deduced from observations on the heating of air rushing into a vacuum the temperature of *minus* 267° as that of the absolute zero. After this time the zero of temperature was generally recognised as a fixed ideal point, but in order to show that it was hypothetical a distinction was drawn between the use of the expressions, zero of absolute temperature and the absolute zero.

The whole question took an entirely new form when Lord Kelvin, in 1848, after the mechanical equivalent of heat had been determined by Joule, drew attention to the great principles underlying Carnot's work on the "Motive Power of Heat," and applied them to an absolute method of temperature measurement, which is completely independent of the properties of any particular substance. The principle was that for a difference of one degree on this scale, between the temperatures of the source and refrigerator, a perfect engine should give the same amount of work in every part of the scale. Taking the same fixed points as for the centigrade scale, and making 100 of the new degrees cover that range, it was found that the degrees not only within that range, but as far beyond as experimental data supplied the means of comparison, differed by only minute quantities from those of Regnault's air thermometer. The zero of the new scale had to be determined by the consideration that when the refrigerator was at the zero of temperature the perfect engine should give an amount of work equal to the full mechanical equivalent of the heat taken up. This led to a zero of 273° below the temperature of freezing water, substantially the same as that deduced from a study of the gaseous state. It was a great advance to demonstrate by the application of the laws of thermodynamics, not only that the zero of temperature is a reality, but that it must be located at 273° below the freezing-point of water. As no one has attempted to impugn the solid foundation of theory and experiment on which Lord Kelvin based his thermodynamic scale the existence of a definite zero of temperature must be acknowledged as a fundamental scientific fact.

LIQUEFACTION OF GASES AND CONTINUITY OF STATE.

In these speculations, however, chemists were dealing theoretically with temperatures to which they could not make any but the most distant experimental approach. Davy and Faraday made the most of the means at command in liquefying the more condensable gases, but chemists were

sorely hampered by the want of some powerful and accessible agent for the production of temperatures much lower than had ever been attained. That want was supplied by Thilorier who in 1835 produced liquid carbonic acid in large quantities and further made the fortunate discovery that the liquid could be frozen into a snow by its own evaporation. Faraday was prompt to take advantage of this new and potent agent. Under exhaustion he lowered its boiling-point from *minus* 78° C to *minus* 110° C., and by combining this low temperature with pressure all the gases were liquefied by the year 1844 with the exception of the three elementary gases—hydrogen, nitrogen, and oxygen—and three compound gases—carbonic oxide, marsh gas, and nitric oxide. Andrews some 25 years after the work of Faraday attempted to induce change of state in the uncondensed gases by using much higher pressures than Faraday employed. Combining the temperature of a solid carbonic acid bath with pressures of 300 atmospheres Andrews found that none of these gases exhibited any appearance of liquefaction in such high states of condensation, but so far as change of volume by high compression went Andrews confirmed the earlier work of Natterer by showing that the gases become proportionately less compressible with growing pressure. While such investigations were proceeding Regnault and Magnus had completed their refined investigations on the laws of Boyle and Gay-Lussac. A very important series of experiments was made by Joule and Kelvin, "On the Thermal Effects of Fluids in Motion," about 1862, in which the thermometrical effects of passing gases under compression through porous plugs furnished important data for the study of the mutual action of the gas molecules. No one, however, had attempted to make a complete study of a liquefiable gas throughout wide ranges of temperature. This was accomplished by Andrews in 1869, and his Bakerian Lecture "On the Continuity of the Gaseous and Liquid States of Matter" will always be regarded as an epoch-making investigation. During the course of this research Andrews observed that liquid carbonic acid raised to a temperature of *minus* 31° C. lost the sharp concave surface of demarcation between the liquid and the gas, the space being now occupied by a homogeneous fluid which exhibited, when the the pressure was suddenly diminished or the temperature slightly lowered, a peculiar appearance of moving or flickering striæ, due to great local alterations of density. At temperatures above *minus* 31° C. the separation into two distinct kinds of matter could not be effected even when the pressure reached 400 atmospheres. This limiting temperature of the change of state from gas to liquid Andrews called the critical temperature. He showed that this temperature is constant and differs with each substance and that it is always associated with a definite pressure peculiar to each body. Thus the two constants, critical temperature and pressure, which have been of the greatest importance in subsequent investigations, came to be defined and a complete experimental proof was given that "the gaseous and liquid states are only distinct stages of the same condition of matter and are capable of passing into one another by a process of continuous change."

In 1873 an essay "On the Continuity of the Gaseous and Liquid State," full of new and suggestive ideas, was published by van der Waals, who, recognising the value of Clausius's new conception of the virial in dynamics, for a long-continued series of motions, either oscillatory or changing exceedingly slowly with time, applied it to the consideration of the molecular movements of the particles of the gaseous substance and after much refined investigation and the fullest experimental calculation available at the time devised his well-known equation of continuity. Its paramount merit is that it is based entirely on a mechanical foundation and is in no sense empiric; we may therefore look upon it as having a secure foundation in fact, but as being capable of extension and improvement. James Thomson, realising that the straight-line breach of continuous curvature in the Andrews isothermals was untenable to the physical mind, propounded his emendation of the Andrews curves—namely, that they were continuous and of S form. We also owe to James Thomson the conception and execution of a three-dimensional model of Andrews's results which has been of the greatest service in exhibiting the three variables by means of a specific surface afterwards greatly extended and developed by Professor Willard Gibbs. The suggestive work of James Thomson undoubtedly was a valuable aid to van der Waals, for as soon as he reached the point where his equation had to show the continuity of the two states this was the first difficulty he had to encounter, and he succeeded in giving the explanation. He also gave a satisfactory reason for the existence of a minimum value of the product of volume and pressure in the Regnault isothermals. His isothermals, with James Thomson's completion of them, were now shown to be the results of the laws of dynamics. Andrews applied the new equation to the consideration of the coefficients of expansion with temperature and of pressure with temperature, showing that although they were nearly equal, nevertheless they were almost independent quantities. His investigation of the capillarity constant was masterly, and he added further to our knowledge of the magnitudes of the molecules of gases and of their mean free paths. Following up the experiments of Joule and Kelvin, he showed how their cooling coefficients could be deduced and proved that they vanished at a temperature in each case which is a constant multiple of the specific critical temperature. The equation of continuity developed by van der Waals involved the use of three constants instead of one, as in the old law of Boyle and Charles, the latter being only utilised to express the relation of temperature, pressure, and volume, when the gas is far removed from its point of liquefaction. Of the two new constants one represents the molecular pressure arising from the attraction between the molecules, the other four times the volume of the molecules. Given these constants of a gas, van der Waals showed that his equation not only fitted into the general characters of the isothermals but also gave the values of the critical temperature, the critical pressure, and the critical volume. In the case of carbonic acid the theoretical results were found to be in remarkable agreement with the experimental values of Andrews. This gave chemists the means of ascertaining the critical constants, provided sufficiently accurate data derived from the study of a few properly distributed isothermals of the gaseous substance were available. Such important data came into the possession of chemists when Amagat published his valuable paper on "The Isothermals of Hydrogen, Nitrogen, Oxygen, Ethylene, &c.," in the year 1880. It now became possible to calculate the critical data with comparative accuracy for the so-called permanent gases oxygen and nitrogen, and this was done by Sarrau in 1882. In the meantime a great impulse had been given to a further attack upon the so-called permanent gases by the suggestive experiments made by Pictet and Cailletet. The static liquefaction of oxygen was effected by Wroblewski in 1883 and thereby the theoretical conclusions derived from van de Waals's equation were substantially confirmed. The liquefaction of oxygen and air was achieved through the use of liquid ethylene as a cooling agent, which enabled a temperature of *minus* 140 degrees to be maintained by its steady evaporation in vacuo. From this time liquid oxygen and air came to be regarded as the potential cooling agents for future research, commanding as they did a temperature of 200 degrees below melting ice. The theoretical side of the question received at the hands of van der Waals a second contribution, which was even more important than his original essay, and that was his novel and ingenious development of what he calls "The Theory of Corresponding States." He defined the corresponding states of two substances as those in which the ratios of the temperature, pressure, and volume to the critical temperature, pressure, and volume respectively were the same for the two substances, and in corresponding states he showed that the three pairs of ratios all coincided. From this a series of remarkable propositions were developed, some new, some proving previous laws that were hitherto only empiric, and some completing and correcting faulty though approximate laws. As examples, he succeeded in calculating the boiling-point of carbonic acid from observations on ether vapour, proved Kopp's law of molecular volumes and showed that at corresponding temperatures the molecular latent heats of vaporisation are proportional to the absolute critical temperature, and that under the same conditions the coefficients of liquid expansion are inversely proportional to the absolute critical temperature and that the coefficients of liquid compressibility are inversely proportional to the critical pressure. It is, perhaps, not too much to say that as a prolific source of knowledge in the department dealing with the continuity of state in matter it would be necessary to go back to Carnot's cycle to find a proposition of greater importance than the theory of van der Waals and his development of the law of corresponding states.

It will be apparent from what has just been said that,

thanks to the labours of Andrews, van der Waals, and others, theory had again far outrun experiment. The problem now was not so much how to produce intense cold as how to save it when produced from being immediately levelled up by the relatively superheated surroundings. Ordinary non-conducting packings were inadmissib e because they are both cumbrous and opaque, while in working near the limits of our resources it is essential that the product should be visible and readily handled. It was while puzzling over this mechanical and manipulative difficulty in 1892 that it occurred to me that the principle of an arrangement used nearly 20 years before in some calorimetric experiments, which was based upon the work of Dulong and Petit on radiation, might be employed with advantage as well to protect cold substances from heat as hot ones from rapid cooling. I therefore tried the effect of keeping liquefied gases in vessels having a double wall, the annular space between being very highly exhausted. Experiments showed that liquid air evaporated at only one-fifth of the rate prevailing when it was placed in a similar unexhausted vessel, owing to the convective transference of heat by the gas particles being enormously reduced by the high vacuum. But in addition these vessels lend themselves to an arrangement by which radiant heat can also be cut off. It was found that when the inner walls were coated with a bright deposit of silver the influx of heat was diminished to one-sixth the amount entering without the metallic coating. The total effect of the high vacuum and the silvering is to reduce the in-going heat to about 3 per cent. The efficiency of such vessels depends upon getting as high a vacuum as possible, and cold is one of the best means of effecting the desired exhaustion. All that is necessary is to fill completely the space that has to be exhausted with an easily condensable vapour, and then to freeze it out in a receptacle attached to the primary vessel that can be sealed off. The advantage of this method is that no air-pump is required, and that theoretically there is no limit to the degree of exhaustion that can be obtained. The action is rapid, provided liquid air is the cooling agent, and vapours like mercury, water, or benzol are employed. It is obvious that when we have to deal with such an exceptionally volatile liquid as hydrogen the vapour filling may be omitted because air itself is now an easily condensable vapour. In other words, liquid hydrogen collected in such vessels with the annular space full of air, immediately solidifies the air and thereby surrounds itself with a high vacuum. In the same way, when it shall be possible to collect a liquid boiling on the absolute scale at about five degrees, as compared with the 20° of hydrogen, then you might have the annular space filled with the latter gas to begin with, and yet get directly a very high vacuum, owing to the solidification of the hydrogen. Many combinations of vacuum vessels can be arranged and the lower the temperature at which we have to operate the more useful they become. Vessels of this kind are now in general use and in them liquid air has crossed the American continent. Of the various forms that variety is of special importance which has a spiral tube joining the bottom part of the walls, so that any liquid gas may be drawn off from the interior of such a vessel. In the working of regenerative coils such a device becomes all-important and such special vessels cannot be dispensed with for the liquefaction of hydrogen.

In the early experiments of Pictet and Cailletet cooling was produced by the sudden expansion of the highly compressed gas preferably at a low temperature, the former using a jet that lasted for some time, the latter an instantaneous adiabatic expansion in a strong glass tube. Neither process was practicable as a mode of producing liquid gases but both gave valuable indications of partial change into the liquid state by the production of a temporary mist. Linde, however, saw that the continuous use of a jet of highly compressed gas, combined with regenerative cooling, must lead to liquefaction on account of what is called the Kelvin-Joule effect, and he succeeded in making a machine, based on this principle, capable of producing liquid air for industrial purposes. These experimenters had proved that, owing to molecular attraction, compressed gases passing through a porous plug or small aperture were lowered in temperature by an amount depending on the difference of pressure and inversely as the square of the absolute temperature. This means that for a steady difference of pressure the cooling is greater the lower the temperature. The only gas that did not show cooling under such conditions was hydrogen. Instead of being cooled it became actually hotter. The reason for this apparent anomaly in the Kelvin-Joule effect is that every gas has a thermometric point of inversion above which it is heated and below which it is cooled. This inversion point, according to van der Waals, is six and three-quarter times the critical point. The efficiency of the Linde process depends on working with highly compressed gas well below the inversion temperature, and in this respect this point may be said to take the place of the critical one when in the ordinary way direct liquefaction is being effected by the use of specific liquid cooling agents. The success of both processes depends upon working within a certain temperature range, only the Linde method gives us a much wider range of temperature within which liquefaction can be effected. This is not the case if, instead of depending on getting cooling by the internal work done by the attraction of the gas molecules, we force the compressed gas to do external work as in the well-known air machines of Kirk and Coleman. Both these inventors have pointed out that there is no limit of temperature, short of liquefaction of the gas in use in the circuit, that such machines are not capable of giving. While it is theoretically clear that such machines ought to be capable of maintaining the lowest temperatures, and that with the least expenditure of power, it is a very different matter to overcome the practical difficulties of working such machines under the conditions. Coleman kept a machine delivering air at *minus* 83° for hours, but he did not carry his experiments any further. Recently M. Claude of Paris has, however, succeeded in working a machine of this type so efficiently that he has managed to produce one litre of liquid air per horse-power expended per hour in the running of the engine. This output is twice as good as that given by the Linde machine and there is no reason to doubt that the yield will be still further improved. It is clear, therefore, that in the immediate future the production of liquid air and hydrogen will be effected most economically by the use of machines producing cold by the expenditure of mechanical work.

LIQUID HYDROGEN AND HELIUM.

Hydrogen is an element of especial interest, because the study of its properties and chemical relations led great chemists like Faraday, Dumas, Daniell, Graham, and Andrews to entertain the view that if it could ever be brought into the state of liquid or solid it would reveal metallic characters. Looking to the special chemical relations of the combined hydrogen in water, alkaline oxides, acids, and salts, together with the behaviour of these substances on electrolysis, we are forced to conclude that hydrogen behaves as the analogue of a metal. After the beautiful discovery of Graham that palladium can absorb some hundreds of times its own volume of hydrogen and still retain its lustre and general metallic character the impression that hydrogen was probably a member of the metallic group became very general. The only chemist who adopted another view was my distinguished predecessor, Professor Odling. In his "Manual of Chemistry," published in 1861, he pointed out that hydrogen has chlorous as well as basic relations, and that they are as decided, important, and frequent as its other relations. From such considerations he arrived at the conclusion that hydrogen is essentially a neutral or intermediate body and therefore we should not expect to find liquid or solid hydrogen possess the appearance of a metal. This extraordinary prevision, so characteristic of Odling, was proved to be correct some 37 years after it was made. Another curious anticipation was made by Dumas in a letter addressed to Pictet, in which he says that the metal most analogous to hydrogen is magnesium and that probably both elements have the same atomic volume, so that the density of hydrogen, for this reason, would be about the value elicited by subsequent experiments. Later, in 1872, when Newlands began to arrange the elements in periodic groups, he regarded hydrogen as the lowest member of the chlorine family; but Mendeleef in his later classification placed hydrogen in the group of the alkaline metals; on the other hand, Dr. Johnstone Stoney classes hydrogen with the alkaline earth metals and magnesium. From this speculative divergency it is clear that no definite conclusion could be reached regarding the physical properties of liquid or solid hydrogen, and that the only way to arrive at the truth was to prosecute low-temperature research until success attended the efforts to produce its liquefaction. This result I definitely obtained in 1898. The case of liquid hydrogen

is, in fact, an excellent illustration of the truth already referred to, that no theoretical forecast, however apparently justified by analogy, can be finally accepted as true until confirmed by actual experiment. Liquid hydrogen is a colourless transparent body of extraordinary intrinsic interest. It has a clearly-defined surface, is easily seen, drops well, in spite of the fact that its surface tension is only the thirty-fifth part of that of water, or about one-fifth that of liquid air, and it can be poured easily from vessel to vessel. The liquid does not conduct electricity, and, if anything, is slightly diamagnetic. Compared with an equal volume of liquid air, it requires only one-fifth the quantity of heat for vaporisation; on the other hand, its specific heat is ten times that of liquid air or five times that of water. The coefficient of expansion of the fluid is remarkable, being about ten times that of gas; it is by far the lightest liquid known to exist, its density being only one-fourteenth that of water; the lightest liquid previously known was liquid marsh gas, which is six times heavier. The only solid which has so small density as to float upon its surface is a piece of pith wood. It is by far the coldest liquid known. At ordinary atmospheric pressure it boils at *minus* 252·5° or 20·5° absolute. The critical point of the liquid is about 29° absolute, and the critical pressure not more than 15 atmospheres. The vapour of the hydrogen arising from the liquid has nearly the density of air—that is, it is 14 times that of the gas at the ordinary temperature. Reduction of the pressure by an air-pump brings down the temperature to *minus* 258°, when the liquid becomes a solid resembling frozen foam, and this by further exhaustion is cooled to *minus* 260°, or 13° absolute, which is the lowest steady temperature that has been reached. The solid may also be got in the form of a clear transparent ice, melting at about 15° absolute, under a pressure of 55 millimetres, possessing the unique density of one-eleventh that of water. Such cold involves the solidification of every gaseous substance but one that is at present definitely known to the chemist and so liquid hydrogen introduces the investigator to a world of solid bodies. The contrast between this refrigerating substance and liquid air is most remarkable. On the removal of the loose plug of cotton-wool used to cover the mouth of the vacuum vessel in which it is stored the action is followed by a miniature snowstorm of solid air, formed by the freezing of the atmosphere at the point where it comes into contact with the cold vapour rising from the liquid. This solid air falls into the vessel and accumulates as a white snow at the bottom of the liquid hydrogen. When the outside of an ordinary test-tube is cooled by immersion in the liquid it is soon observed to fill up with solid air and if the tube be now lifted out a double effect is visible, for liquid air is produced both in the inside and on the outside of the tube—in the one case by the melting of the solid and in the other by condensation from the atmosphere. A tuft of cotton-wool soaked in the liquid and then held near the pole of a strong magnet is attracted and it might be inferred therefrom that liquid hydrogen is a magnetic body. This, however, is not the case: the attraction is due neither to the cotton-wool nor to the hydrogen—which, indeed, evaporates almost as soon as the tuft is taken out of the liquid—but to the oxygen of the air, which is well known to be a magnetic body, frozen in the wool by the extreme cold.

The strong condensing powers of liquid hydrogen afford a simple means of producing vacua of very high tenuity. When one end of a sealed tube containing ordinary air is placed for a short time in the liquid the contained air accumulates as a solid at the bottom while the higher part is almost entirely deprived of particles of gas. So perfect is the vacuum thus formed that the electric discharge can be made to pass only with the greatest difficulty. Another important application of liquid air, liquid hydrogen, &c., is as analytic agents. Thus, if a gaseous mixture be cooled by means of liquid oxygen only those constituents will be left in the gaseous state which are less condensable than oxygen. Similarly, if this gaseous residue be in its turn cooled in liquid hydrogen a still further separation will be effected, everything that is less volatile than hydrogen being condensed to a liquid or solid. By proceeding in this fashion it has been found possible to isolate helium from a mixture in which it is present to the extent of only one part in 1000. By the evaporation of solid hydrogen under the air-pump we can reach within 13° or 14° of the zero, but there or thereabouts our progress is barred. This gap of 13° might seem at first sight insignificant in comparison with the hundreds that have already been conquered. But to win one degree low down the scale is quite a different matter from doing so at higher temperatures; in fact, to annihilate these few remaining degrees would be a far greater achievement than any so far accomplished in low temperature research. That the zero will ever be reached by man is extremely improbable. But supposing the experimenter to be able to reach within a few degees of the zero it is by no means certain that he would find the near approach of the death of matter sometimes pictured. Any forecast of the phenomena that would be seen must be based on the assumption that there is continuity between the processes studied at attainable temperatures and those which take place at still lower ones. But it would be rash to take for granted that the changes which have been traced in explored regions continue to the same extent and in the same direction in those which are as yet unexplored, for evidence to a contrary effect has already been obtained in at least one case. A series of experiments with pure metals showed that their electrical resistance gradually decreases as they are cooled to lower and lower temperatures, in such ratio that it appeared probable that at the zero of absolute temperature they would have no resistance at all and would become perfect conductors of electricity. This was the inference that seemed justifiable by observations taken at depths of cold which can be obtained by means of liquid air and less powerful refrigerants. But with the advent of the more powerful refrigerant liquid hydrogen it became necessary to revise that conclusion. A discrepancy was first observed when a platinum resistance thermometer was used to ascertain the temperature of that liquid boiling under atmospheric and reduced pressure. All known liquids, when forced to evaporate quickly by being placed in the exhausted receiver of an air-pump, undergo a reduction in temperature, but when hydrogen was treated in this way it appeared to be an exception. The resistance thermometer showed no such reduction as was expected and it became a question whether it was the hydrogen or the thermometer that was behaving abnormally. Ultimately, by the adoption of other thermometrical appliances, the temperature of the hydrogen was proved to be lowered by exhaustion as theory indicated. Hence, it was the platinum thermometer which had broken down; in other words, the electrical resistance of the metal employed in its construction was not, at temperatures about *minus* 250° C., decreased by cold in the same proportion as at temperatures about *minus* 200°. This being the case, there is no longer any reason to suppose that at the absolute zero platinum would become a perfect conductor of electricity, and in view of the similarity between the behaviour of platinum and that of other pure metals in respect of temperature and conductivity the presumption is that the same is true of them also. It may safely be predicted that liquid hydrogen will be the means by which many obscure problems of physics and chemistry will ultimately be solved, so that the liquefaction of the last of the old permanent gases is as pregnant now with future consequences of great scientific moment as was the liquefaction of chlorine in the early years of the last century.

The next step towards the absolute zero is to find another gas more volatile than hydrogen and that we possess in the gas occurring in clevite, identified by Ramsay as helium, a gas which is widely distributed, like hydrogen, in the sun, stars, and nebulæ. A specimen of this gas was subjected by Olszewski to liquid air temperatures, combined with compression and subsequent expansion, following the Cailletet method, and resulted in his being unable to discover any appearance of liquefaction, even in the form of mist. His experiments led him to infer that the boiling-point of the substance is probably below nine degrees absolute. After Lord Rayleigh had found a new source of helium in the gases which are derived from the Bath springs, and liquid hydrogen became available as a cooling agent, a specimen of helium cooled in liquid hydrogen showed the formation of fluid, but this turned out to be owing to the presence of an unknown admixture of other gases. As a matter of fact, a year before the date of this experiment I had recorded indications of the presence of unknown gases in the spectrum of helium derived from this source. When subsequently such condensable constituents were removed the purified helium showed no signs of liquefaction, even when compressed to 80 atmospheres, while the tube containing it was surrounded with solid hydrogen. Further on suddenly expanding no instantaneous mist appeared. Thus, helium was definitely proved to be a much more volatile substance

than hydrogen in either the liquid or solid condition. The inference to be drawn from the adiabatic expansion effected under the circumstances is that helium must have touched a temperature of from 9° to 10° for a short time without showing any signs of liquefaction and consequently that the critical point must be still lower. This would force us to anticipate that the boiling-point of the liquid will be about five degrees absolute, or liquid helium will be four times more volatile than liquid hydrogen, just as liquid hydrogen is four times more volatile than liquid air. Although the liquefaction of the gas is a problem for the future this does not prevent us from safely anticipating some of the properties of the fluid body. It would be twice as dense as liquid hydrogen with a critical pressure of only four or five atmospheres. The liquid would possess a very feeble surface-tension and its compressibility and expansibility would be about four times that of liquid hydrogen, while the heat required to vapourise the molecule would be about one-fourth that of liquid hydrogen. Heating the liquid one degree above its boiling point would raise the pressure by one and three-quarter atmospheres, which is more than four times the increment for liquid hydrogen. The liquid would be only 17 times denser than its vapour, whereas liquid hydrogen is 65 times denser than the gas it gives off. Only some three or four degrees would separate the critical temperature from the boiling-point and the melting-point, whereas in liquid hydrogen the separation is respectively 10° and 15°. As the liquid refractivities for oxygen, nitrogen, and hydrogen are closely proportional to the gaseous values, and as Lord Rayleigh has shown that helium has only one-fourth the refractivity of hydrogen, although it is twice as dense, we must infer that the refractivity of liquid helium would also be about one-fourth that of liquid hydrogen. Now, hydrogen has the smallest refractivity of any known liquid, and yet liquid helium will have only about one-fourth of this value—comparable, in fact, with liquid hydrogen just below its critical point. This means that the liquid will be quite exceptional in its optical properties and very difficult to see. This may be the explanation of why no mist has been seen on its adiabatic expansion from the lowest temperatures. Taking all these remarkable properties of the liquid into consideration one is afraid to predict that we are at present able to cope with the difficulties involved in its production and collection.

THE UPPER AIR AND AURORAS.

If a sample of liquid air cooled to the low temperature that can be reached by its own evaporation be connected by a pipe to a condenser cooled in liquid hydrogen then any volatile gases present in solution but less condensable than the chief constituents of the atmosphere will distil over with the first portions of the air, and can be pumped off, being uncondensable at the temperature of the condenser. In this way a gas mixture containing of the known gases free hydrogen, helium, and neon has been separated from liquid air. The total uncondensable gas separated in this way amounts to about one fifty-thousandth of the volume of the air. That free hydrogen exists in air in small amount is conclusively proved, but the actual proportion found by the process is very much smaller than Gautier has estimated by the combustion method. The recent experiments of Lord Rayleigh show that Gautier, who estimated the hydrogen present as one five-thousandth, has in some way produced more hydrogen than he can manage to extract from pure air by a repetition of the same process. The spectroscopic examination of these gases throws new light upon the question of the aurora and the nature of the upper air. On passing electric discharges through the tubes containing the most volatile of the atmospheric gases they glow with a bright orange light, which is especially marked at the negative pole. The spectroscope shows that this light consists, in the visible part of the spectrum, chiefly of a succession of strong rays in the red, orange, and yellow, attributed to hydrogen, helium, and neon. Besides these, a vast number of rays, generally less brilliant, are distributed through the whole length of the visible spectrum. The greater part of these rays are of, as yet, unknown origin. The violet and ultra-violet part of the spectrum rivals in strength that of the red and yellow rays. As these gases probably include some of the gases that pervade inter-planetary space, search was made for the prominent nebular, coronal, and auroral lines. No definite lines agreeing with the nebular spectrum could be found, but many lines occurred closely coincident with the coronal and auroral spectrum. But before discussing the spectroscopic problem it will be necessary to consider the nature and condition of the upper air.

According to the old law of Dalton, supported by the modern dynamical theory of gases, each constituent of the atmosphere while acted upon by the force of gravity forms a separate atmosphere, completely independent, except as to temperature, of the others, and the relations between the common temperature and the pressure and altitude for each specific atmosphere can be definitely expressed. If we assume the altitude and temperature known then the pressure can be ascertained for the same height in the case of each of the gaseous constituents, and in this way the percentage composition of the atmosphere at that place may be deduced. Suppose we start with a surface atmosphere having the composition of our air, only containing two ten-thousandths of hydrogen, then at 37 miles, if a sample could be procured for analysis, we believe that it would be found to contain 12 per cent. of hydrogen and only 10 per cent. of oxygen. The carbonic acid practically disappears; and by the time we reach 47 miles, where the temperature is *minus* 132°, assuming a gradient of 3·2° per mile, the nitrogen and oxygen have so thinned out that the only constituent of the upper air which is left is hydrogen. If the gradient of temperature were doubled the elimination of the nitrogen and oxygen would take place by the time 37 miles was reached with a temperature of *minus* 220°. The permanence of the composition of the air at the highest helium altitudes, as deduced from the basis of the dynamical theory of gases, has been discussed by Stoney, Bryan, and others. It would appear that there is a consensus of opinion that the rate at which gases like hydrogen and helium could escape from the earth's atmosphere would be excessively slow. Considering that to compensate any such loss the same gases are being supplied by actions taking place in the crust of the earth, we may safely regard them as necessarily permanent constituents of the upper air. The temperature at the elevations we have been discussing would not be sufficient to cause any liquefaction of the nitrogen and oxygen, the pressure being so low. If we assume the mean temperature as about the boiling-point of oxygen at atmospheric pressure then a considerable amount of the carbonic acid must solidify as a mist if the air from a lower level be cooled to this temperature, and the same result might take place with other gases of relatively small volatility which occur in air. This would explain the clouds that have been seen at an elevation of 50 miles without assuming the possibility of water vapour being carried up so high. The temperature of the upper air must be above that on the vapour pressure curve corresponding to the barometric pressure at the locality, otherwise liquid condensation must take place. In other words, the temperature must be above the dew-point of air at that place. At higher elevations, on any reasonable assumption of temperature distribution, we inevitably reach a temperature where the air would condense, just as Fourier and Poisson supposed it would, unless the temperature is arrested in some way from approaching the zero. Both ultra-violet absorption and the prevalence of electric storms may have something to do with the maintenance of a higher mean temperature. The whole mass of the air above 40 miles is not more than one seven-hundredth part of the total mass of the atmosphere, so that any rain or snow of liquid or solid air, if it did occur, would necessarily be of a very tenuous description. In any case the dense gases tend to accumulate in the lower strata and the lighter ones to predominate at the higher altitudes, always assuming that a steady state of equilibrium has been reached. It must be observed, however, that a sample of air taken at an elevation of nine miles has shown no difference in composition from that at the ground, whereas, according to our hypothesis the oxygen ought to have been diminished to 17 per cent. and the carbonic acid should also have become much less. This can only be explained by assuming that a large intermixture of different layers of the atmosphere is still taking place at this elevation. This is confirmed by a study of the motions of clouds about six miles high which reveals an average velocity of the air-currents of some 70 miles an hour; such violent winds must be the means of causing the intermingling of different atmospheric strata. Some clouds, however, during hot and thundery weather, have been seen to reach an elevation of 17 miles, so that we have direct proof that on occasion the lower layers of atmosphere are carried

to a great elevation. The existence of an atmosphere at more than 100 miles above the surface of the earth is revealed to us by the appearance of meteors and fireballs, and when we can take photographs of the spectrum of such apparitions we shall learn a great deal about the composition of the upper air. In the meantime Pickering's solitary spectrum of a meteor reveals an atmosphere of hydrogen and helium, and so far this is corroborative of the doctrine which we have been discussing. It has long been recognised that the aurora is the result of electric discharges within the limits of the earth's atmosphere, but it was difficult to understand why its spectrum should be so entirely different from anything which could be produced artificially by electric discharges through rarified air at the surface of the earth. Writing in 1879, Rand Capron, after collecting all the recorded observations, was able to enumerate no more than nine auroral rays, of which but one could with any probability be identified with rays emitted by atmospheric air under an electric discharge. But since that time observations of the spectra of auroras have been greatly multiplied, chiefly through the Swedish and Danish Polar Expeditions, and the length of spectrum recorded on the ultra-violet side has been greatly extended by the use of photography, so that, in a recent discussion of the results, M. Henri Stassano is able to enumerate upwards of 100 auroral rays, of which the wave-length is more or less approximately known, some of them far in the ultra-violet. Of this large number of rays he is able to identify, within the probable limits of errors of observation, about two-thirds as rays, which Professor Liveing and myself have observed to be emitted by the most volatile gases of atmospheric air unliqueflable at the temperature of liquid hydrogen. Most of the remainder he ascribes to argon, and some he might, with more probability, have identified with krypton or xenon rays, if he had been aware of the publication of wave-lengths of the spectra of those gases, and the identification of one of the highest rays of krypton with that most characteristic of auroras. The rosy tint often seen in auroras, particularly in the streamers, appears to be due mainly to neon of which the spectrum is remarkably rich in red and orange rays. The predominance of neon is not surprising, seeing that from its relatively greater proportion in air and its low density it must tend to concentrate at higher elevations.

[Professor Dewar here discussed the spectroscopic phenomena of auroras at some length and explained the theory of Arrhenius accounting for the electric discharges which are generally believed to occasion them. He then continued :]

VARIOUS LOW-TEMPERATURE RESEARCHES.

We may now summarise some of the results which have already been attained by low temperature studies. In the first place, the great majority of chemical interactions are entirely suspended, but an element of such exceptional powers of combination as fluorine is still active at the temperature of liquid air. Whether solid fluorine and liquid hydrogen would interact no one can at present say. Bodies naturally become denser, but even a highly expansive substance like ice does not appear to reach the density of water at the lowest temperature. This is confirmatory of the view that the particles of matter under such conditions are not packed in the closest possible way. The force of cohesion is greatly increased at low temperatures, as is shown by the additional stress required to rupture metallic wires. This fact is of interest in connexion with two conflicting theories of matter. Lord Kelvin's view is that the forces that hold together the particles of bodies may be accounted for without assuming any other agency than gravitation or any other law than the Newtonian. An opposite view is that the phenomena of the aggregation of molecules depend upon the molecular vibration as a physical cause. Hence, at the zero of absolute temperature, this vibrating energy being in complete abeyance, the phenomena of cohesion should cease to exist, and matter generally should be reduced to an incoherent heap of cosmic dust. This second view receives no support from experiment.

The photographic action of light is diminished at the temperature of liquid air to about 20 per cent. of its ordinary efficiency, and at the still lower temperature of liquid hydrogen only about 10 per cent. of the original sensitivity remains. At the temperature of liquid air or liquid hydrogen a large range of organic bodies and many inorganic ones acquire under exposure to violet light the property of phosphorescence. Such bodies glow faintly so long as they are kept cold but become exceedingly brilliant during the period when the temperature is rising. Even solid air is a phosphorescent body. All the alkaline earth sulphides which phosphoresce brilliantly at the ordinary temperature lose this property when cooled, to be revived on heating; but such bodies in the first instance may be stimulated through the absorption of light at the lowest temperatures. Radio-active bodies, on the other hand, like radium, which are naturally self-luminous, maintain this luminosity unimpaired at the very lowest temperature and are still capable of inducing phosphorescence in bodies like the platino-cyanides. Some crystals become for a time self-luminous when cooled in liquid air or hydrogen, owing to the induced electric stimulation causing discharges between the crystal molecules. This phenomenon is very pronounced with nitrate of uranium and some platino-cyanides.

[Professor Dewar here gave a concise *résumé* of the results of a long series of experiments, made in conjunction with Professor Fleming, on the electric and magnetic properties of bodies at low temperatures. The subjects that had been under investigation might be classified as follows: The Thermo-Electric Powers of Pure Metals; the Magnetic Properties of Iron and Steel; Dielectric Constants; the Magnetic and Electric Constants of Liquid Oxygen; and Magnetic Susceptibility. He then continued :]

The effect of cold upon the life of living organisms is a matter of great intrinsic interest as well as of wide theoretical importance. Experiment indicates that moderately high temperatures are much more fatal, at least to the lower forms of life, than are exceedingly low ones. Professor McKendrick froze for an hour at a temperature of *minus* 182° C. samples of meat, milk, &c., in sealed tubes; when these were opened after being kept at blood heat for a few days their contents were found to be quite putrid. More recently some more elaborate tests were carried out at the Jenner Institute of Preventive Medicine on a series of typical bacteria. These were exposed to the temperature of liquid air for 20 hours, but their vitality was not affected, their functional activities remained unimpaired, and the cultures which they yielded were normal in every respect. The same result was obtained when liquid hydrogen was substituted for air. A similar persistence of life in seeds has been demonstrated even at the lowest temperature; they were frozen for over 100 hours in liquid air, at the instance of Messrs. Brown and Escombe, with no other result than to affect their protoplasm with a certain inertness, from which it recovered with warmth. Subsequently commercial samples of barley, pea, vegetable marrow, and mustard seeds were literally steeped for six hours in liquid hydrogen at the Royal Institution, yet when they were sown by Sir W. T. Thiselton-Dyer at Kew in the ordinary way the proportion in which germination occurred was no less than in the other batches of the same seeds which had suffered no abnormal treatment. Bacteria are minute vegetable cells which it has been found possible completely to triturate when the operation is carried out at the temperature of liquid air, the cells then being frozen into hard breakable masses. The typhoid organism has been treated in this way and the cell plasma obtained for the purpose of studying its toxic and immunising properties. It would hardly have been anticipated that liquid air should find such immediate application in biological research. A research by Professor Macfadyen, just concluded, has shown that many varieties of micro-organisms can be exposed to the temperature of liquid air for a period of six months without any appreciable loss of vitality, although at such a temperature the ordinary chemical processes of the cell must cease. At such a temperature the cells cannot be said to be either alive or dead, in the ordinary acceptation of these words. It is a new and hitherto unobtained condition of living matter—a third state. A final instance of the application of the above methods may be given. Certain species of bacteria during the course of their vital processes are capable of emitting light. If, however, the cells be broken up at the temperature of liquid air and the crushed contents brought to the ordinary temperature the luminosity function is found to have disappeared. This points to the luminosity not being due to the action of a ferment—a "Luciferase"—but as being essentially bound up with the vital processes of the cells and dependent for its production on the intact organisation of the cell. These attempts to study by frigorific methods the physiology of the cell have already yielded valuable and encouraging results, and it is to be hoped that this line of investigation will continue to be vigorously prosecuted at the Jenner Institute.

And now, in conclusion, I may remind you that I commenced by referring to the plaint of Elizabethan science, that cold was not a natural available product. In the course of a long struggle with nature, man, by the application of intelligent and steady industry, has acquired a control over this agency which enables him to produce it at will and with almost any degree of intensity short of a limit defined by the very nature of things. But the success in working what appears at first sight to be a quarry of research that would soon suffer exhaustion has only brought him to the threshold of new labyrinths. The battle-fields of science are the centres of a perpetual warfare in which there is no hope of final victory, although partial conquest is ever triumphantly encouraging the continuance of the disciplined and strenuous attack on the seemingly impregnable fortress of nature.

TETANUS AND VACCINATION:

AN ANALYTICAL STUDY OF 95 CASES OF THE COMPLICATION.

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DURING the year 1901 an unusual number of cases of small-pox in different parts of the United States stimulated the health authorities to a vigorous endeavour to protect the public by vaccination and in that year great activity in this direction took place throughout the United States.

The occurrence of a number of cases of tetanus succeeding vaccination, at first in Cleveland, Ohio, and then in Camden, New Jersey, early attracted my attention as this, to me, unknown complication seemed a matter of the greatest importance, increasing the danger of vaccination and correspondingly increasing the animosity of those misguided persons who have banded themselves together for the organised opposition of this well-recognised and only safeguard against small-pox.

The cases of tetanus in Camden have been so exploited in the newspapers and have been made the subject of so many editorial articles and comments in the medical press that they will, no doubt, form the starting-point of numerous future attacks against vaccination, so that I deemed it important that as many cases of the complication as could possibly be collected should be brought together and carefully analysed in order to determine whether tetanus is a necessary or an avoidable complication of vaccination. If necessary, we should be prepared for it and should know how often to expect it; if avoidable, we should seek to eliminate it by every precaution regarding the selection of a superior virus and the performance of a careful operation. At all events, we should know what relationship exists between the two affections.

TETANUS IS NOT A RECOGNISED COMPLICATION OF VACCINATION.

The only text-book in which I have been able to find any mention made of the complication is the recent edition of Osler's "Text-book of Medicine," in which it is simply stated that "tetanus occasionally follows vaccination." In the Minority report of the British Commission, published in 1896, in which the disadvantages of vaccination are carefully and forcibly summarised, a single case, apparently the only one they were able to collect, is mentioned. Ordinary writers upon vaccination entirely ignore tetanus. The literature on the subject is extremely meagre. In the Index Catalogue of the Surgeon-General's Library at Washington only *seven* cases are mentioned under titles by which they can be recognised and I have found a total of but 14 cases in the literature. These cases have occurred at remote periods in different parts of the world and were all attributed to secondary infection of the wound. It seems reasonable, therefore, to conclude that tetanus has not been a frequent or important complication of vaccination in the past, either in this or any other country. It may, however, be surmised that what is true at the present time has also been true in the past and that when a case of tetanus did occur an attempt was made to suppress rather than to publish it, lest its influence should be injurious; but if in the past any such epidemics of tetanus had taken place as have been recently experienced the medical literature would certainly contain some reference to it, for, suppressed as the cases are at the present time, very few of the recent cases having been published in detail, rumours of cases and editorial articles referring to the cases and speculating upon their occurrence are to be found in many of the journals both in this country and abroad. The lack of information concerning the complication cannot depend upon the failure to recognise it, as tetanus has been a well-known disease for centuries and, indeed, very little has been added to its symptomatology since the days of Hippocrates.

I have been able to collect a total of 95 cases of tetanus following vaccination. Throughout the paper I shall refer to "cases," meaning by the term occurrences of tetanus that I have succeeded in authenticating and of which I have considerable detail, while the term "rumour" will be used for cases of tetanus the occurrence of which is certain but concerning which for various reasons I have been unable to secure the details. The greater part of my information has been collected by personal correspondence and has been obtained with the request that it should be regarded as confidential. I do not, therefore, append the synoptical lists from which my conclusions are drawn, though I can at once place the matter at the disposal of anyone interested in the subject.

Cases of tetanus following vaccination are reported as follows:—

1854.—**Isabella XX.** Dr. J. D. Cottman, *New Orleans Medical and Surgical Journal*, 1854-55, vol. xi., p. 783.

1878.—**Edward K.** Dr. G. Ross, *South Clinic*, Richmond, Va., 1878-79, vol. i., p. 468.

1882.—**Ben Jones.** Dr. W. C. T. Bates, Transactions of the South Carolina Medical Association, Charleston, 1882, vol. xxxii., p. 105.—**John McLane** Dr. T. Dimon, *St. Louis Courier of Medicine*, 1882, vol. vii., p. 310-312.—**D. M.** Dr. H. J. Berkeley, *Maryland Medical Journal*, Baltimore, 1882-1883, vol. ix., pp. 241-245.

1886.—**Male.** Dr. Rudesindo Garcia Rijo, *Cron. Med. Quir. de la Habana*, 1886, vol. xii., p. 388.

1889.—**Infant.** Bromley Case. THE LANCET, Nov. 2nd, p. 922) and 9th (p. 970), 1889.

1891.—**Negro boy.** Dr. Ruiz, *Cron. Med.-Quir. de la Habana*, 1891, vol. xvii., p. 649.

1893.—**M. D. W.** Bellport, L.I. Dr. S. W. S. Toms, *Medical News*, Feb. 24th, 1894.

1897.—**British Commission case.** Appendix IX. to the Final Report of the Royal Commission on Vaccination, 1897, Case 10, p. 6.

1899.—**A. K., XXX**, and **C. R.** Surgeon-General's Report, June 30th, 1900, pp. 205 and 206.

1901.—**XXX.** Dr. W. Findlay and Dr. J. W. Findlay, THE LANCET, Feb. 22nd, 1902, p. 506.

TABLE I.—*Synoptical Table of the Cases.*

Cases from the literature			14
Cases collected but not published—			
a. With complete details	40		
b. With incomplete details	13		
		53	
Rumours		28	
			95

Fatalities	61	Adults	25	Males	38
Recoveries	24	Children	45	Females	29
Unknown	10	Unknown	25	Unknown	28
	95		95		95

The following table shows the chronological order of the cases which I have succeeded in collecting.

TABLE II.—*Cases of Tetanus showing the Chronological Occurrence.*

Chronology.	Cases.	Rumours.	Chronology.	Cases.	Rumours.
1854	1	—	1898	3	2
1878	1	—	1899	3	—
1882	3	—	1900	1	—
1886	1	—	1901	45	18=63
1889	1	—	1902	5	1
1891	1	—	Unknown date ...	—	1
1892	0	6		67	28
1896	1	—		95	
1897	1	—			

TABLE IIA.—*Showing the Month of Appearance of Symptoms of Tetanus in the Cases occurring in 1901.*

	Cases.		Cases.
January	0	July	1
February	0	August	1
March	1	September	1
April	0	October	1
May	0	November	24
June	1	December	7

TABLE IIB.—*Showing the Locality and Source of Virus in Cases occurring in November, 1901.*

Case.	Locality.	Virus.	Case.	Locality.	Virus.
33	Atlantic City, N.J.	E	54	Philadelphia, Pa.	E
27	St. John's, N.B.	E	55	,,	E
26	Three Rivers, Ont.	I	58	,,	E
34	Atlantic City, N.J.	E	66	Camden, N.J.	E
36	,,	E	67	,,	E
37	,,	E	68	,,	E
39	Milville, N.J.	E	69	,,	E
40	Bridgeton, N.J.	E	70	,,	E or A
47	Bristol, Pa.	S	72	,,	E or A
48	,,	E	73	,,	E or A
52	Philadelphia, Pa.	E or A	74	,,	E
53	,,	E	76	,,	E

Virus E = 18 cases; E or A = 4 cases; S = 1 case; I = 1 case; total, 24 cases.

The large number of cases in the year 1901 indicates that some exceptional condition existed that changed an unimportant and infrequent complication into a very important and frequent one.

The occurrence of tetanus as a complication of vaccination has been variously explained as follows.

1. *That it is an accidental, secondary infection of the vaccination sore.*—Those holding this view think that the complication depends upon conditions ever present and only to be expected and that its deplorable occurrence can be prevented by the exercise of greater skill and caution in the performance of the operation of vaccination and in the subsequent treatment of the wound. That such a micro-organism as the tetanus bacillus, the natural habitat of which is the soil and which occurs widely disseminated in nature, may occasionally be able accidentally to find its way into vaccination lesions cannot be gainsaid. It is certainly possible, and may occasionally happen, as, indeed, the scattered cases in the literature seem to prove, but there are very cogent reasons opposed to the view that the many cases of 1901 can be so explained, and to content one's self with this simple explanation may be to fall into egregious error, for if tetanus does thus occur it should do so in all parts of the world and with more or less regularity.

The various indices to the medical literature are without any references to cases of tetanus following vaccination in most European countries. A communication from the Imperial Health Office of Berlin informs me that the complication is *unknown in the German Empire.* Letters from the Pasteur Institute at Paris, the Pasteur Institute at Lille, and the French Institute inform me that the complication is *unknown in France.* No cases appear to have occurred in Italy, Russia, Austria, or other European countries, so that we are engaged in the consideration of a complication that is chiefly American, has become important within a year, and was epidemic in the month of November, 1901.

2. *That the occurrence of the complication depends upon a local prevalence of the tetanus germs.*—The epidemic in Camden has been attributed to germs in the dust of that city, in which there had been a prolonged period of dry weather. Were this the true explanation we should find ordinary traumatic tetanus occurring more frequently than usual. See tables of statistics of Camden and Philadelphia Health Departments. This is, however, not the case, as aside from the vaccination cases there were fewer than the usual number of cases both in Camden and Philadelphia. Further, while it is true that a greater number of cases of tetanus following vaccination occurred in Camden than in other places of equal size, the occurrence of tetanus following vaccination has too wide a geographical distribution to be explained in this way.

Cases are reported from 17 different States in the United States, from the Dominion of Canada, Porto Rico, the Philippine Islands, Cuba, &c.

TABLE III.—*Report of the Board of Health, Room 610, City Hall, Philadelphia, March 4th, 1902.—Deaths from Tetanus.*

Months.	1897.	1898.	1899.	1900.	1901.
January	6	5	0	4	3
February	1	4	3	1	1
March	4	2	2	3	0
April	1	1	0	4	2
May	1	4	3	3	1
June	3	3	3	1	1
July	1	1	10	6	6
August	3	1	7	5	1
September	3	1	3	1	2
October	1	3	5	5	5
November	1	2	2	1	4
December	3	2	3	3	3
Totals	28	29	41	37	29

Note.—This table is of but small value, as it shows no apparent increase of tetanus during the year 1901 and shows only 29 reported cases in all, whereas I have been able to collect nine fatal cases resulting from vaccination. Should we subtract these we would find much less traumatic tetanus than usual in Philadelphia during that year. The table certainly shows very little, but fails to show that because of atmospheric or telluric conditions tetanus was exceptionally prevalent in Philadelphia during 1901.

TABLE IV.—*Report of the Health Department of the City of Camden.—Deaths from Tetanus.*

—	1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890
January	—	—	—	—	—	—	—	—	—	—	—	—
February	—	—	—	—	—	—	—	—	—	—	1	—
March	—	—	—	—	—	—	—	—	—	—	—	—
April	—	—	—	—	—	—	—	—	—	—	—	—
May	—	—	1	—	1	—	—	—	—	—	—	—
June	—	—	—	—	—	—	1	—	—	—	—	—
July	1	—	—	—	—	—	—	—	—	—	—	—
August	—	—	—	2	—	—	—	—	—	—	—	—
September	—	—	—	1	—	—	—	1	—	—	—	1
October	—	—	—	—	—	—	—	—	—	—	—	—
November	9	—	—	—	—	—	—	—	—	—	—	—
December	1	1	—	—	—	—	—	—	—	—	—	—
Totals	11	1	1	3	1	—	1	1	—	—	1	1

Note.—I was able to collect 11 cases of tetanus following vaccination in Camden and one case of traumatic tetanus occurred about the same time, making a total of 12 cases. The table shows 11 deaths. Three of the vaccination cases recovered, so that there is here a slight difference between my collected cases and the report of the Health Department. The eight fatal vaccination cases, plus the fatal traumatic case, subtracted from the 11 reported fatalities, leave us two cases unaccounted for—a difference not sufficient to show any greater general prevalence of the disease than occurred in 1898.

That geographical conditions may exert a pronounced influence upon the occurrence of the tetanus which is known to be particularly prevalent in certain districts. Thus it is said that Cuba and Porto Rico have soils particularly rich in tetanus bacilli and that Long Island has a similar dangerous soil. That such an influence is important is, however, very doubtful, as from the so-called dangerous localities very few cases have been reported (three Cuba, three Porto Rico, and two Long Island). (See table.)

TABLE V.—*Tetanus Cases showing the Geographical Distribution.*

	Cases.	Rumours.
Canada.—Three Rivers, Quebec	1	—
St. John, N.B.	1	—
Connecticut.—South Glastonbury	1	—
Cuba.—Havana	3	—
England.—Recorded in THE LANCET	1	—
Commissioners' Report	1	—
Illinois.—Chicago	0	1
Louisiana.—New Orleans	1	—
Maine.—Biddeford	1	—
Maryland.—Baltimore	1	—
Massachusetts.—Belmont	1	—
Cambridgeport	1	—
East Dennis	1	—
Boston	1	—
Michigan.—Kalamazoo	1	—
Minnesota.—Minneapolis	1	—
Taylors Falls	1	—
Missouri.—St. Louis	0	1
New Jersey.—Atlantic City	2	2
Bridgeton	1	—
Camden	11	—
Jordantown	0	1
Millville	1	—
New York.—Albany	1	—
Long Island	2	—
Owego	1	—
Ocean.—City of Para	1	—
Ohio.—Cincinnati	0	1
Cleveland	4	—
Pennsylvania.—Bristol	2	—
Easton	1	—
Girardville	1	—
Lyndell	1	—
Millbach	0	1
Philadelphia	11	12
Rosemont	0	2
Philippine Islands	1	—
Porto Rico	1	2
Scotland	1	—
South Carolina.—Charleston	1	—
Tennessee.—Paris	1	—
Unknown	0	6
Virginia.—Richmond	1	—
Wisconsin.—Milwaukee	1	—
	67	28
	95	

3. *That carelessness in the treatment of the vaccination wound facilitates accidentally secondary infection with tetanus.*—While this has a ring of genuineness about it, and is doubtless true in some of the scattered cases, the argument is extremely unconvincing when applied to the cases of 1901. For 100 years vaccinations have been performed with a total disregard to cleanliness and asepsis in all parts of the world, on all classes of people, in towns and cities, by careless and careful physicians, upon clean and dirty persons, without the use of any dressing, yet during these many years tetanus has remained almost an unknown complication. We cannot conceive of any difference between the social conditions of the present and those of the past that are not immensely in favour of the present, yet it is at present that we find tetanus epidemic.

In our own country greater care is undoubtedly exercised at the present time than heretofore, and in those countries in which, because of ignorance and poverty, the same social conditions prevail at the present time that existed a hundred years ago—as, for example, among the peasantry of Europe—we find tetanus practically unknown.

Vaccination wounds are treated with much greater care at the present time than ever before, and it is now becoming recognised that vaccination is an operation, and that to free it from the common dangers of all operative manipulations cleanliness and care are essential. We therefore find that at present the skin is cleansed and disinfected and the lesion itself protected and subsequently dressed with a care never dreamed of a few years ago, yet when we come to examine the details of those cases which have come within our knowledge we find that this care of the wound appears to be without influence upon the occurrence of tetanus, for while many cases have occurred among ignorant and filthy children, in an equally great number of cases more than ordinary care seems to have been exercised. Thus one case occurred in the person of an adult sister of a physician in Cleveland, Ohio. Both the patient and the operator were refined and cultured people, were apprehensive of the results, and exerted unusual precautions, yet despite all death from tetanus followed this vaccination. Here let it be said that the virus associated with so many cases (virus E) was used.

The ignorant and filthy people of the island of Porto Rico, with no knowledge of hygiene or personal cleanliness, living in a place reputed to be extremely dangerous because of tetanus bacilli in the soil, were vaccinated by the United States authorities after the occupation of that territory, and out of some 800,000 vaccinations three cases of tetanus, two of which are very doubtful, are reported by Dr. George G. Groff.

4. *The use of a shield to protect the vaccination wound has recently become quite common and has been blamed for the occurrence of tetanus.*—The shield has, however met with violent and perhaps justifiable condemnation, on the ground that the pressure of its edges and of the adhesive plaster bandages by which it is held in place obstruct the lymphatic circulation and increase the severity of the wound and the danger of infection, also that the shield induces anaerobic conditions, so that by some the occurrence of tetanus has been blamed upon the shield. Upon looking over the reported cases, however, we find so few in which shields were used that they seem to have no influence upon the occurrence of the complication.

THE RELATION OF TETANUS TO THE VACCINE VIRUS.

With the evolution of vaccination as a prophylactic measure certain changes in technique have been gradually introduced. Thus bovine virus has now displaced the arm-to-arm and human scab vaccinations previously practised, and within the last quarter of a century the use of human virus has been almost entirely given up. Can it be that the danger from tetanus has something to do with the bovine virus? In a few of the early cases drawn from the literature tetanus followed the use of human virus. That the bovine virus is at fault seems possible when we consider that it is only in the last half-century that cases of tetanus have occurred, yet it can scarcely be at fault in itself, as bovine virus is the only form employed in Belgium, Germany, France, and other European countries where no tetanus has occurred. While it is suggestive that the first cases of tetanus reported in the literature make their appearance about the time bovine virus began to come into general use, it is not true that the number of reported cases increased in proportion to the popularity of the bovine virus, for from 1852, when the first case I have found makes its appearance in the literature, until 1901 only isolated cases are reported, usually at intervals of years.

The next step in the evolution of vaccination was the improvement in the quality of the virus, suggested by Copeman in 1891, by which glycerine was permitted to act for some time upon the virus for the purpose of destroying the undesirable micro-organisms it contained. By the use of the glycerine a bacteria-free virus may thus be secured. This improved virus made slow but steady progress, until at the present time it has attained the greatest popularity and bids fair to replace all other forms. It is used almost exclusively in Europe and has made very large inroads into America.

The glycerinated virus is so new, having been in use but 10 years and in common use little more than five years, that we are scarcely able to express a positive opinion regarding its advantages and disadvantages. The advantage of having the contaminating bacteria destroyed by the glycerine is indisputable; the disadvantage of occasionally having the glycerine act so long that the specific germs of vaccinia are killed and the virus made inert is also indisputable. That at times when the demands upon the manufacturer are exceptionally great the virus mixed with the glycerine might be placed upon the market before the necessary time had elapsed for the contained bacteria to be killed is a somewhat grave danger. These possibilities have somewhat lessened the confidence with which the preparation is received and used by many practitioners.

When we come to investigate the cases of tetanus concerning which information is at hand we are somewhat

startled to find that a large number of them have succeeded the employment of this supposedly best and most refined preparation. This point will be discussed below.

It must also be pointed out that the epidemics of tetanus which are the subject of this paper occurred at a time when an almost unprecedented demand for virus taxed the output of the manufacturers to their utmost and must have tempted them to market "partly refined" goods. It is not impossible that it was insufficient contact with the glycerine that permitted tetanus bacilli to remain alive in the virus, though as glycerine fails to kill tetanus spores it is doubtful whether this is the chief or sole error.

TABLE VI.—*Showing the Relation of Tetanus to the Make of the Virus.*

Viruses.	Dry.	Glycerinated.		Totals.
		Points.	Tubes.	
E	3	10	17	30
A	2	—	—	2
D	0	—	2	2
W	0	1	—	1
S	0	—	3	3
I	1	—	—	1
G	1	—	—	1
—	7	11	22	40
Proportion..	7	33		

Relationship to particular brands of virus.—When an attempt is made to determine whether the employment of any particular brand or make of virus is succeeded by an unusually large number of cases of tetanus we discover that while an occasional case of tetanus has succeeded the use of the virus of nearly all of the large manufacturers, the great majority of the cases of 1901 have succeeded the use of a particular brand of virus and make us suspect that the tetanus bacilli were contained within it.

The brands of virus to be considered are called E, D, A, S, W, I, St. and Wd. Those called E, A, and D are the products of the largest American manufacturers who it is not improbable do about an equal amount of business. It is safe to say that these vaccines are all made with the exercise of as great amount of skill as present knowledge permits. No care or expense is spared to have these products perfect. We find, however, a remarkable discrepancy in the results following their employment—a discrepancy that leads me to conclude that the tetanus bacillus is contained in the virus and distributed with it. Careful examination of the accompanying table will show the disproportion of cases.

The occurrence of 30 cases of tetanus after the employment of virus E suggests that tetanus germs were present in it in larger proportions than in any other, though the occurrence of only 30 cases following the use of millions of doses of this virus indicates that the number of tetanus organisms present is small and the occurrence of the cases in groups that their distribution is irregular.

The occurrence of cases in groups.—In this connexion must be pointed out as interesting and significant the groups of cases that have occurred from time to time. Thus in Cleveland, Ohio, during 1901 we note the occurrence of four cases; in Camden, New Jersey, during October, November and December, 1901, the occurrence of 11 cases; at Atlantic City, about the same time, five cases; and in Philadelphia and vicinity nearly at the same time about 25 cases (and rumours). If we analyse the cases we find one vaccine (virus E) chiefly if not exclusively implicated. The most instructive group of cases that I have been able to study occurred in the Philadelphia Hospital. In this institution with nearly 4500 inmates there was a threatened epidemic of small-pox depending upon the admission of a case of small-pox from the street. After one or two cases had developed within the institution it was decided to vaccinate every inmate, and the resident physician went systematically through the institution, vaccinating sick and well alike. The institution was thus vaccinated with the exception of the Men's Insane Department, the greater number of the inmates of which were obliged to wait a few days until a new consignment of virus arrived. With this new consignment (virus E) they were then all vaccinated. Upon looking up the statistics of the hospital we find that in the insane departments, male and female, no case of spontaneous traumatic tetanus had developed within 12 years. It is, in fact, not known that there ever has been a case of traumatic tetanus developed within the walls of the institution, but this cannot be determined as the records prior to 12 years ago were destroyed by fire. Succeeding the vaccination, however, a group of tetanus cases, confined exclusively to the Men's Insane Department, occurred. Here five typical cases with trismus and opisthotonos and every marked symptom of the disease occurred, all being followed by death, four from trismus itself and one from pneumonia occurring immediately after a cessation of the spasms. The occurrence of this outbreak occasioned much alarm, so that every suspicious vaccination wound observed was thoroughly excised and treated antiseptically. After this excision of the wounds 11 additional cases developed trismus and muscular rigidity, though after the administration of enormous doses of antitoxin they all recovered. In going carefully over the details of these cases I find that with one very doubtful exception (vaccinated with E or A) every patient who developed tetanus was vaccinated with the same virus which had caused tetanus at Cleveland, Camden, Atlantic City, and elsewhere (virus E). As the diagnosis of the 11 cases that recovered is somewhat questionable I have included them among the *rumours* and have not introduced them into the statistical tables. Should it be suggested that the occurrence of the cases of tetanus in groups depends upon the popularity of the virus in certain districts, as Philadelphia, Camden, and Atlantic City, where it was almost exclusively used, and that in these districts some telluric, atmospheric, or other condition prevailed, causing them to be more predisposed to tetanus than the country in general, the idea should be at once dispelled by a few moments' consideration of the statistics presented. Thus, if we deduct from the 30 cases succeeding the use of virus E, the six positive cases occurring in Camden, the seven positive cases occurring in Philadelphia, and the three positive cases occurring in Cleveland, there remain against this virus a total of 14 cases, which is greater than the sum total of all the cases referable to all the other viruses produced in the country, thus showing that even where the cases are scattered and not in groups virus E has four times as many cases against it as any other virus and more cases than all the other viruses put together.

In the accompanying table 40 cases are presented with exact information concerning the make and form of virus employed. Of these 40 cases, 30 follow the employment of virus E, 10 follow the use of all other forms combined, and no single other virus has a higher number than three. This seems to show quite convincingly that there is something about virus E that is different from the others. In addition to these 40 cases with complete details I have eight additional cases in which it is known that one or the other of two viruses was used but in which it cannot now be certainly determined which of the two it was.

TABLE VII.—*Cases of Disputed Virus where One or the Other of Names are Given.*

Cases.	E	A	D	W	W.I	St.
25	1	—	—	1	—	—
29	1	—	1	—	—	—
45	1	—	—	—	—	1
56	1	1	—	—	—	—
71	1	1	—	—	—	—
72	1	1	—	—	—	—
73	1	1	—	—	—	—
91	—	—	1	—	1	—
—	7	4	2	1	1	1

We find that in the cases of this group vaccine E figures in seven. If we assume, which it would be fairly justifiable to do, that in all of these cases virus E was used, then the disproportion is changed from E 30 to all others 10 (30 : 10), to E 37 to all others 10 (37 : 10), thus making matters worse. If, however, we proceed on the reverse order and admit that

E may be erroneously charged with these cases we find the proportion E 30 to all others 18 (30 : 18), so that matters are but little improved for virus E. Comparing E with the other viruses made by equally large houses the disproportion is, of course, much more striking than when comparing it with the sum of all others, thus —

E 30 (without disputed cases) ...	D 2.
E 37 (with disputed cases) ...	
E 30	A 2.
E 37	
E 30	S 3.
E 37	

It certainly seems impossible that if the viruses were of equally good quality such a disproportion as 30 : 2 and 30 : 3 could persist.

TABLE VIII.—*Table of Comparisons.*

Viruses.	Known.	Disputed.
E	30	7
A	2	4
S	2	0
D	3	2
W	1	1
Wd	0	1
St	0	1
G	1	0
M I	1	0

If we refer to the chronological table given it becomes apparent that it is only occasionally that outbreaks of tetanus following vaccination occur. The scattered cases in the literature and the few cases observed to occur after the employment of viruses of all makes may depend upon secondary infection. In the few cases contained in the literature in which tetanus succeeded arm-to-arm vaccination this is very probably true, but it is impossible for this explanation to apply in the sudden appearance of 24 cases (without rumours) that developed during November, 1901. The only explanation that appeals to me is that while secondary infection of vaccination wounds occurs very rarely and while tetanus bacilli are contained in bovine vaccine in numbers large enough to produce tetanus occasionally, sometimes through accidents or carelessness unusually large numbers of tetanus bacilli get into the virus with resulting epidemics such as the one which is here considered. Granting the possibility of this it becomes of prime importance that the utmost precaution should be exercised in preparing the virus, and if possible that some new method should be adopted by which its manufacture shall be carried out without the possibility of danger of this kind.

Dry and glycerinised viruses.—The respective influence of dry and glycerinised virus upon the causation of tetanus is shown by reference to Table VI., where it is shown that seven cases followed the use of dry points, 11 the use of glycerinised points, and 22 the glycerinised tube virus. This proportion (seven to 33) appears to be convincingly in favour of the dry virus, but we find an error resulting from virus E. All three forms of virus E have been followed by tetanus in the respective proportions of dry points three, to glycerinised points 10, and glycerinised tube virus 17. If we entirely omit virus E from the consideration we find the totals of all other viruses to be :—

Dry points		4	
Glycerinised points	1	6	= 4 : 6
Glycerinised tubes	5		

The proportion of four dry to six glycerinised is about correct when we remember that the glycerinised is the popular virus at the present time. This seems to show that there is no important disproportion in favour of dry over glycerinised virus as regards the occurrence of tetanus.

The source of the tetanus bacilli in virus.—When we consider the distribution of the tetanus bacillus in nature we find it in the soil chiefly whereon it has been well fertilised and in manure. The tetanus bacillus is, no doubt, frequently swallowed by herbivorous animals in browsing upon the surface of the ground, and the anaerobic conditions for its growth being excellent we find that the intestines of herbivorous animals commonly contain large numbers of the bacilli which escape with the evacuations to be again deposited upon the soil in increased numbers. The first source of danger, therefore, by which vaccine virus can be contaminated is the manure of the calf, the next source the dusts arising from the dry manure and the soil, both of which may be brought into the stables with the hay or upon the animals.

When large hay-fed animals are employed for the manufacture of virus the manure is certainly a source of danger, but in stables where sucking calves are used for the purpose fewer tetanus bacilli are present in the excrement. However, Huddleson found them present in the fæces of 8 per cent. of the small calves used in the laboratory of the Health Department of New York. It is evident that from these sources opportunities for the entrance of tetanus germs into the vaccine virus occur, but as a matter of fact no one has yet succeeded in finding them in the virus. This indicates that their number must be so small that in the distribution of the virus in tubes and on points hundreds or thousands of tubes escape where one is contaminated. It must be unusual for many tetanus germs to be implanted at the time of vaccination but no doubt such implantations can and do occur.

The incubation period.—The period of incubation or ordinary traumatic tetanus varies from a few hours to several weeks (see chart), according to statistics derived from the study of a large number of cases.

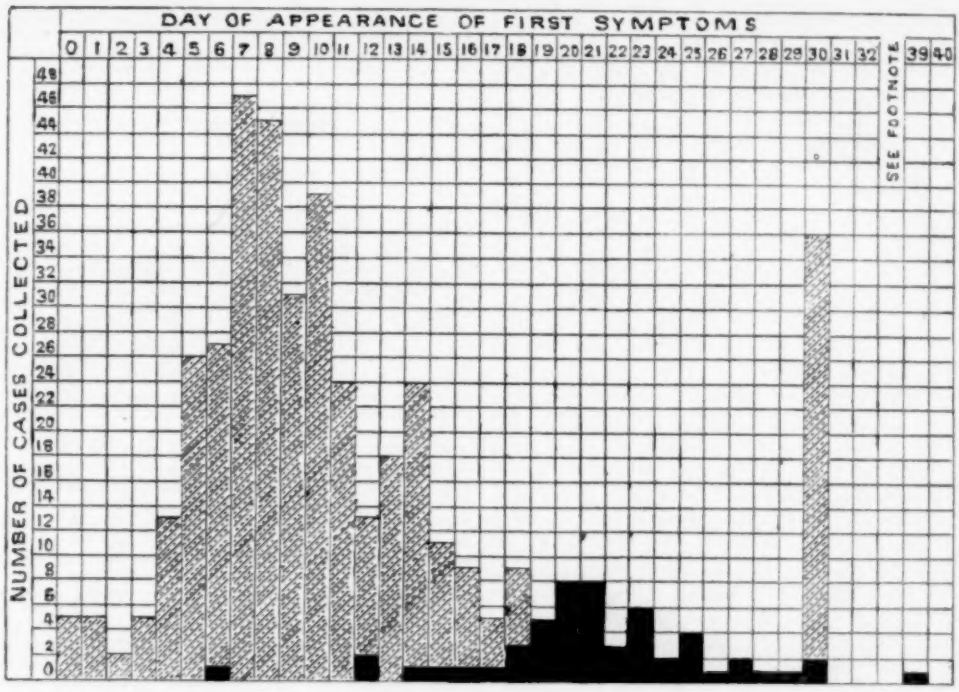
TABLE IX.—*Tetanus Cases, showing Incubation Period.*

Shortest period	6	days.
Longest period	39	,,
Average...	22	,,
For points—		
Shortest period	16	,,
Longest period	30	,,
Average...	23	,,
For glycerine virus—		
Shortest period	6	,,
Longest period	39	,,
Average...	22	,,

The usual incubation period varies from seven to nine days. In the vaccination cases—that is, in cases of tetanus following vaccination—we find the shortest period of incubation to be six days, the longest 39 days, and the average 22 days. It is thus seen that tetanus following vaccination appears on the average about two weeks later than ordinary traumatic tetanus. This is the chief weak point in my argument and I think that if this error could be eliminated it would at once be conceded that the remaining facts are indisputable. The prolonged incubation is usually interpreted to signify that the infecting organism entered the vaccination as a secondary infection. In truth, however, how rarely do superficial ulcerations become infected with tetanus. Did anyone ever hear of a sudden paroxysmal outbreak of 61 cases of tetanus in one year following the infection of leg-ulcers, furuncles, mosquito bites, &c., even when cleanliness was not observed?

I think after the statistical demonstration that this secondary infection theory must be looked upon as a misinterpretation and that the fact probably is that the tetanus bacillus being ingrafted into the skin at the time of vaccination fails to find suitable conditions for its growth until the development of the vaccine lesion paves the way for it by the local destruction of tissue. This enables us to add to the usual period of incubation an additional period (a couple of weeks), during which the wound has been prepared for the implanted organisms to grow, thus bringing the entire period to the length usually observed in the vaccination cases. An examination of Table IX. shows that no difference exists between dry vaccine on points and glycerinised virus regarding the length of the incubation period.

In nearly every case in which I have succeeded in securing details I learned that the vaccination "took well." This may not be without significance, though it may be interpreted in several ways. It may mean that those vaccinations in which marked local lesions occur are those in which secondary infection has the best chance of occurrence. If so, it means that severe vaccination lesions are dangerous and that mild viruses should be used, the multiple insertion of a mild virus being preferable to a single insertion of an active virus. It may also mean that the lesion was caused by an impure virus in which the tetanus bacillus might be contained as well as other organisms. Lastly, and I think truly, it



Period of incubation.—The columns in light shading represent cases of traumatic tetanus (387 in number); the black columns represent cases of vaccination tetanus (54 in number). In the original diagram the eight vertical columns with the headings 31 to 38 inclusive were blank; five of these were omitted in the reproduction, as above indicated, for economy of space.

may mean that it is only when such local lesions occur that the *implanted* tetanus bacilli can find conditions suitable for their development.

Reference is again to be made to the chronological development of the cases, by which it will be observed that the majority of cases occur at times when, because of agitation concerning small-pox, the demands for virus are great. This being the case, it is not impossible that vaccine viruses are sometimes marketed prior to the time when the action of the glycerine has extinguished the life of the bacteria in the virus and with less than the customary precautions regarding excellence of quality.

CONCLUSIONS.

The following conclusions seem justifiable. 1. Tetanus is not a frequent complication of vaccination. 2. The number of cases observed during 1901 was out of all proportion to what had been observed heretofore. 3. The cases are chiefly American and occur scattered throughout the eastern United States and Canada. 4. The cases have nothing to do with atmospheric or telluric conditions. 5. A small number occurred after the use of various viruses. 6. An overwhelming proportion occurred after the use of a certain virus (E). 7. The tetanus organism is in the virus in small numbers, being derived from the manure and hay. 8. Occasionally through carelessness or accident the number of bacilli becomes greater than usual and may lead to the epidemic occurrence of tetanus. 9. The future avoidance of the complication is to be sought for in greater care in the preparation of the vaccine virus.

NOTE.—Since writing the above the final proof needed to complete the argument seems to be given by Dr. Robert M. Willson who contributed to the Philadelphia County Medical Society on April 23rd, 1902, the information that he had discovered tetanus bacilli in large numbers in a vaccine virus made about the time of the epidemic of 1901. This bacillus, which was microscopically demonstrated to the society, was virulent for the small laboratory animals.

Philadelphia.

A SUCCESSFUL CASE OF GASTRECTOMY FOR CARCINOMA OF THE PYLORUS AND LESSER CURVATURE OF THE STOMACH.

BY G. A. SYME, M.S., M.B. MELB., F.R.C.S. ENG.,
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THE operation of gastrectomy is on its trial. Mr. W. Watson Cheyne and Mr. F. F Burghard in their recently published "Manual of Surgical Treatment," say: "Although the entire stomach has been removed for cancer with temporary success, we cannot think that the number of cases in which this can be done will be large; nor do we look upon the operation as at all a favourable one." They do not even describe the operation, as "if the growth be sufficiently large to warrant such a severe procedure, it is practically beyond hope of immunity from recurrence."

In the following case the operation as performed was not such a very severe procedure, and though it remains to be seen whether the growth will recur there is reason to believe that it has been radically removed. It seems to me that in all cases of gastric carcinoma, where operation is advisable at all, gastrectomy is indicated, as, it having been proved that the stomach is not essential for digestion, the more complete its removal the greater should be the probable immunity from recurrence, while the risk is not proportionally increased. If at all possible, it is, however, wise, for physiological reasons as well as for ease in operation, to leave a small portion of healthy stomach.

As compared with pylorectomy the operation as performed in this case was easier and took less time, because there was less stomach surface to suture. The cut edges were easily and rapidly brought together with continuous silk sutures (through all the coats) and then the duodenum was implanted

into the very small surface of the fundus that was left. Had there been difficulty in approximation I would have closed the duodenum and attached the jejunum. The microscopical examination subsequently showed that where cut the stomach was perfectly normal, though the growth was disseminating widely along the lymphatics.

For the detailed notes and for careful attention to the after-treatment of the case I am indebted to Dr. Murphy, resident medical officer at St. Vincent's Hospital, Melbourne, to which institution the patient, a married woman, aged 55 years, was admitted on May 8th, 1902, under my care. She complained of pain in the abdomen and vomiting. She stated that except for occasional pain in the left shoulder she had enjoyed good health until seven months previously when she began to suffer from indigestion and flatulence. Five months previously she began to vomit, and had continued to vomit, at intervals of one or two days, up to the time of her admission. The vomiting generally occurred at night, and she brought up food taken eight or 10 hours previously, as well as acid watery matter. She had lost weight.

On examination she was found to be a spare active woman, looking younger than her years, but distinctly emaciated. Just above the umbilicus was a hard moveable tumour of the size of a mandarin-orange. The stomach was dilated. Her pulse was 90 and rather small in volume but strong. Her temperature was 99° F. All the other organs and the urine appeared to be normal. On May 11th she was given a test-meal which was withdrawn four and a half hours afterwards and examined by Dr. Wilkinson, assistant demonstrator of physiology, Melbourne University, who reported that the meal was considerably digested and that no free hydrochloric acid could be found. On the 13th and 14th the stomach was washed out and again on the morning of the 15th, when the operation was performed under ether anæsthesia.

The abdomen was opened in the mid line, between the ensiform appendix and the umbilicus. The pylorus was found to be occupied by a hard growth which extended along the lesser curvature and in radiating lines over the anterior stomach wall. No enlarged glands could be detected. The cardia appeared to be free from disease. After a little deliberation it was decided to remove the stomach. The abdominal incision was enlarged and the stomach was delivered from the abdominal cavity and packed off with plain sterilised gauze, wet with hot sterilised normal saline solution. The small omentum was ligatured off in sections with silk (and the pyloric and gastric arteries secured) at a distance of about one and a half inches from the lesser curvature and then divided. The great omentum was ligatured and divided in a similar way. The cardiac end of the stomach was then clamped obliquely in long forceps (not covered with rubber) and the stomach on the distal side of the clamps and about one and a half inches from them was tied round with a piece of rubber tubing. The stomach was then divided between the clamps and tubing, so that the whole of the lesser curvature up to the œsophagus was removed and the greater part of the greater curvature, leaving about two and a half inches of cardia attached to the œsophagus. The stomach and growth were turned over the abdominal wall to the right and out of the way and covered with hot sterile gauze wet with saline solution. The cut edges of the stomach beyond the clamps were disinfected and then sutured with a continuous silk suture through all the coats and then a continuous Lembert silk suture was passed through the sero-muscular coat, invaginating the previous one. Further search was then made for infected glands and some, though not obviously hard or enlarged, were removed from near the pancreas. The duodenum was then clamped about one inch from the growth and a rubber ligature was tied round it nearer the growth; the duodenum was divided between the two and the stomach and growth were removed. The cut edges of the duodenum were disinfected and approximated to the remaining portion of stomach and œsophagus and laterally implanted on it. One wall of the duodenum was attached to the stomach by a continuous serous suture, the ends being left long. The stomach was then incised and the cut edge next the suture was attached to the adjacent duodenal wall with a continuous suture through all the coats and this was carried all round. The serous suture was then finished off. The exposed viscera were flushed with hot saline solution and replaced. The abdominal incision was then closed with through-and-through sutures. An enema of one pint of saline solution and one ounce of brandy was administered and the patient was put to bed. The operation took a little over an hour. The following diagram roughly shows the amount of stomach removed and the position of the growth. The shock

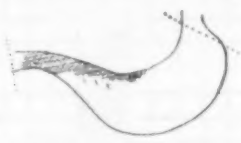

Diagram of stomach showing portion affected by growth shaded.

was not great and the patient rallied well. She was fed by nutrient enemata, alternating with saline, every four hours.

On May 16th enemata (nutrient and saline alternately) were administered every four hours and one-fortieth of a grain of strychnine was given every four hours. The temperature was 101°, the pulse was 112, and the respirations were 24. The patient was feeling well. On the 17th one drachm of water was given occasionally by the mouth. The temperature was 100°, the pulse was 116, and the respirations were 20. From two drachms to half an ounce of sterilised water or peptonised milk was given every two hours by the mouth. Enemata were administered every four hours. On the 18th her general condition was good. The temperature was 99°, the pulse was 80, and the respirations were 20. From one drachm to half an ounce of water, peptonised milk, or broth was given every hour. Nutrient enemata were administered every six hours. On the 19th the patient was feeling very well. The temperature was 99°, the pulse was 80, and the respirations were 20. Half an ounce of peptonised milk, water, broth, or beef-tea was given every hour. No discomfort was experienced after taking it. An enema was administered every eight hours. The bowels acted on this date. On the 20th the patient was feeling very well. The temperature was 99° and the pulse was 80. One ounce of water, peptonised milk, beef-tea, Benger's food, or jelly was given every hour and occasionally she had small drinks. On the 21st the temperature was 99° and the pulse was 80. She was given one and a half ounces as above or solution of plasmon every one and a half hours. Two enemata were administered in the 24 hours. On the 22nd the temperature and pulse were normal. She was taking one and a half ounces of nourishment every hour with occasional drinks. 10 minims of dilute hydrochloric acid were given with the nourishment. She did not like taking the acid. On the 24th the temperature and pulse were normal. She was taking two ounces of nourishment every hour with occasional drinks. On the 25th she was taking three ounces every two hours and one drachm of somatose every three hours. The hydrochloric acid was discontinued; she said that she felt better without it. On the 28th she was having five ounces of nourishment every two hours with a little bread-crumb and bread-and-butter. She experienced no feeling of indigestion. All the sutures were removed. On the 30th she was taking six ounces of milk, bread-and-milk, custard, somatose, fish, or arrow-root every two or three hours. On June 3rd the diet was as follows: six ounces of liquid and occasionally tripe, mashed potatoes, boiled eggs, and bread-and-butter. She did not suffer from indigestion. The temperature and pulse were normal and she was feeling very well. On the 4th she was taking the same articles of diet as on the 3rd, also grilled steak, mashed potatoes and cauliflower, and biscuits. On the 12th she was eating ordinary food and could take as much as she did when she was quite well. She did not suffer from indigestion. No acid or pepsin was given. She said that she could feel the food going into the intestine. She was increasing in weight and strength and was walking about. She stated that she felt very well. On the 17th she was discharged.

The patient and the specimen removed were exhibited at the July meeting of the Medical Society of Victoria, and the following report on the specimen has been received from Dr. H. G. Chapman, demonstrator of pathology, Melbourne University: "The part removed consisted of the first part of the duodenum, the pyloric end, and a portion of the cardia and fundus, of the stomach. The removed duodenum measured 40 millimetres from the sphincter pylori. The stomach has been divided obliquely, the lesser curvature being cut 90 millimetres and the greater curvature 270 millimetres from the pyloric groove. At the pyloric orifice

and extending into the duodenum for about 10 millimetres and towards the stomach walls, especially along the lesser curvature, was a diffuse thickening, fading imperceptibly towards the stomach walls. The cut edges were free from thickening. On section the cut edge of the diffuse thickening showed a white downgrowth from the mucous to the muscle layer. Sections under the microscope showed a carcinomatous downgrowth from the glands through the muscularis mucosæ into the submucous coat, but nowhere directly passing into the muscular coat, which was, however, diffusely infiltrated with cancer cells lying along the lymphatic vessels. In the deeper part of the mucous membrane all glandular structure was lost in a diffuse mass of carcinoma. In the submucosa, on the edge of the cancerous infiltration, were collections of small round cells betokening irritation. There had been a considerable dissemination along the lymphatics, accounting for the general thickening and giving rise to early 'gizzard-like cancer' Sections taken close to the incision at the lesser curvature were free from growth, with the mucous membrane everywhere clearly defined and the muscle free from infiltration."

Melbourne.

A CASE OF HÆMOPHILIA IN A WOMAN WITH SYMPTOMS OF DEFECTIVE CIRCULATION IN THE LEGS AND THREATENED GANGRENE OF THE TOES; DEATH WITH CEREBRAL SYMPTOMS.

BY JOSEPH A. ARKWRIGHT, M.D. CANTAB.

THE patient was a single woman, aged about 30 years at the time of her death in November, 1901, of fair complexion, tall, large-boned, and well developed. None of her relatives in previous generations were known to have been "bleeders." She had two sisters, both alive, one aged about 26 years who suffered from attacks of dyspepsia and vomiting which lasted for weeks or months, but who had good health between the attacks, though at one time she was very anæmic; the second sister was 13 years old and had very good health. There was one brother, 20 years of age, who had hæmophilia but not very severely; he had had excessive swelling and ecchymosis about one knee from a slight injury and swelling and pain in the hip-joint after a very slight injury. On other occasions he had had troublesome bleeding from a cut on the thumb and great swelling and ecchymosis which continued to increase for some days after a bruise of the upper arm. The present patient had always had a tendency to anæmia and had suffered from dyspepsia. In 1890 a superficial cut on one finger bled for two or three days, but some years ago she had a tooth extracted without excessive hæmorrhage. On Sept. 15th, 1893, a right lower first molar was extracted and the next day the bleeding had not stopped and the patient was very pale and faint; the hæmorrhage was arrested by applying pressure and the strong solution of perchloride of iron. On Nov. 14th, 1893, the right upper second bicuspid was extracted and the bleeding continued till the next day when it was stopped in the same way as before, but on the 16th it recurred till it was finally arrested by the same means, tincture of hamamelis being also taken internally. On Nov. 5th, 1894, she complained of pain in the lower limbs; there were aching pains in the left thigh and hip, chiefly in the anterior part, as though "in the bone," which had been present and had never quite left her for eight weeks; sometimes they were severe, especially at night and they had been worse during the last month; there had also been pain in the right thigh like that on the left side, especially along the anterior aspect, and for the last 24 hours also in the right hip and in the sacrum. There was no tenderness on pressure except over the front of the femur on the right side just above the knee. The patient's temperature was normal in the daytime. About the middle of November the pains began to get better, and by Dec. 25th she was very much better, but there were still some pains in the limbs. In April, 1898, she complained of bad "neuralgic" pains in her right arm which improved after she had taken Blaud's pills and arsenic for a short time. On April 25th, 1898, she twisted her right ankle slightly in getting over a stile. On the next day the ankle was swollen, and on the 28th the ankle had become much more swollen, in spite of rest, and the skin was tense and hot; there was also much ecchymosis. On Sept. 1st tense ecchymosed swelling of the calf and ankle followed a slight injury. In November the bleeding from a slight cut on the finger lasted for two or three days and was then only arrested with some difficulty by very hot water and tight bandaging. In the summer of 1900 the left leg was noticed to be colder than the right and a variable purple mottling was almost constantly present on the skin of the left leg below the knee. These two symptoms persisted from this time onwards. In the very cold frosty weather of the winter 1900–1901 the ends of the toes on the left foot became black and purple and gangrene threatened. This condition passed off with rest and elevation but returned several times after walking a short distance; at one time there was some ulceration. The purpuric mottling about this time spread from the leg on to the left thigh, hip, buttocks, and the opposite (right) hip and outer side of the right thigh. For four months in the summer of 1901 she was in the General Hospital, Birmingham, and whilst there the toes were at one time very bad but later regained their natural appearance. A relapse again occurred after a journey and walking a little and the toes became painful and discoloured. While in hospital she also had an attack of general rheumatic (?) pains in the legs and arms, especially in the left elbow, with raised temperature. On August 28th, 1901, the toes were less well after sitting out of doors in rather cold and damp weather. On Oct. 1st a sharp attack of bleeding from the gums occurred without any known exciting cause; the gums were not at all spongy or sore. On Oct. 7th the patient was found to be better with regard to the pain and the circulation in the legs, but lately the hands had been colder and sometimes the fingers blue and the hands mottled with a purplish colour; both the radial arteries felt small; the general nutrition and appearance were good and the appetite was fair. Both the legs were mottled and purplish; there was no raised erythema. The left leg was much more mottled than the right and the mottling was most over the malleoli and on the dorsum of the foot. The right great toe was dusky in colour; the left middle toe was black at the end and a little dried serum was to be seen on the surface but no moist discharge was ever noticed. There was no pain and both feet were warm but they were kept well wrapped up and raised; the feet easily became cold and if on the floor for long became painful but not hot. The left dorsalis pedis artery was felt beating but the left posterior tibial artery could not be felt; the right dorsalis pedis artery was not felt but the right posterior tibial was felt beating. On Oct. 15th the left little and middle toes were seen to be almost black. On the 17th these toes were slightly better in colour and the right foot had only some mottling on the dorsum, no duskiness of the toes. The left foot and leg were noticed to tremble and twitch (this was seen to affect especially the tendons of the tibiales muscles) when the limb was held up unsupported, but the right foot and leg did not tremble. The left knee-jerk was exaggerated; the left plantar reflex was absent; the right knee-jerk was very much exaggerated; a tap set up clonus; the right plantar reflex was very feebly obtained. Ankle clonus could not be obtained on either side. On Nov. 1st, after the legs had been lightly massaged daily for a fortnight, the feet were thought to have kept warmer and the toes a better colour on the whole. On the morning of the 4th the patient felt better but had complained of a headache for the last two days and the feet were rather colder, but this was usual just before the menstrual period, which was due that day. In the evening, at 7.30, while talking to a friend, the mouth "began to be drawn to one side, then the head to one side, and then she said she was choking and put her hands to her throat. Soon after convulsions on one side of the body and twitching of the left arm and leg began and she sweated profusely; she spoke and complained of pain over her eyes." At 8.30 P.M. there was conjugate deviation of the eyes to the right; the pupils were small and equal and reacted to light; one eyeball was slightly bulging. She was dull mentally but spoke sensibly once; occasionally she became restless and excited, throwing her limbs about, and passed urine under her. After this she went to sleep but woke again and was "convulsed" several times in the night, "struggling" much latterly. Her breathing became noisy at 4 A.M. on Nov. 5th and she died at 5.15 A.M.

This case presented an unusual combination of symptoms. The tendency to bleeding was shared by a brother, and though not extreme and not traced to a former generation it resembled hæmophilia. The coldness and deficient blood-supply to the lower limbs had some resemblance to Raynaud's disease, but the symptoms were too persistent and progressive and did not intermit with sufficient completeness to agree with the classical description of that disease; moreover, the symmetry was very imperfect. Exacerbations were generally excited by the use or dependent position of the legs and were not truly paroxysmal. The mottling of the skin affected the lower limbs high up and even the buttocks and consequently the circulation must have been defective in these parts. This suggests some obstruction to the main arteries of the limbs, but the arteries supplying the feet were also not all felt beating in the usual situations. An arteritis, or constriction of the smaller arteries, possibly due to nervous influence, seems to be the most likely explanation of the symptoms, but this leaves the ultimate cause and the connexion with the tendency to hæmorrhages unaccounted for. Perhaps the neuralgic pains in the limbs were due to deficient blood-supply or deep hæmorrhages. The final cerebral symptoms preceding death are best explained by meningeal hæmorrhage determined by the increased blood-pressure preceding the menstrual period, but intracranial hæmorrhage does not appear to be a recognised cause of death in hæmophilia.

Halesowen.

THE ULTIMATE RESULTS IN A SERIES OF 76 CASES OF FRACTURE OF THE TIBIA AND FIBULA.

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DURING the last few years several articles have appeared in the medical journals drawing attention to the treatment and prognosis in the case of simple fractures of the bones of the lower limbs. Fractures of the tibia and fibula have perhaps received the chief attention, and although most of the surgeons who have recently written upon this subject express themselves as being dissatisfied with the ultimate results obtained after the so-called ordinary methods of treatment, yet it would be difficult to find any two surgeons who entirely agree as to some of the important details in the remedies suggested. For example, one surgeon, believing that the impaired utility of the limb after a fracture of the bones is largely due to hæmorrhage into, and inflammatory thickening of, the soft parts at the seat of the fracture, advocates the early employment of massage. Another surgeon, believing that spasmodic muscular contraction is a very important factor in preventing the correct apposition of the broken fragments, practises tenotomy, while a third surgeon, being convinced that the subsequent utility of the injured limb will be directly proportionate to the accuracy of the reduction of the fracture, does not hesitate to cut down upon the fractured ends and to fix them together with wire or a screw. All are, however, agreed that the age of the individual is one of the most important factors as regards prognosis. It is a well-established fact that if a child sustains a fracture of the femur or of the tibia and fibula the probabilities are that the ultimate utility of the limb will be in no way impaired.

My personal experience of fractures of this kind in children has been somewhat extensive, for in the 10 years during which I was connected with the Liverpool Infirmary for Children I forcibly straightened—or, in other words, broke—more than 1400 crooked legs. In all these cases the fracture produced was a simple fracture either of the lower end of the femur or of the tibia and fibula, according as the deformity corrected was a knock-knee or a bowed leg. The after-results were in every way satisfactory in respect to the union of the fracture and the position and utility of the limb. When, on the other hand, a fracture occurs in an adult the prognosis for obvious reasons is much more grave and the object of this communication is to try to arrive at a fair estimate of the after-results from these injuries. My original intention was to include fractures of the femur, patella, tibia, and fibula, but for the present I propose to limit my remarks to the treatment and prognosis after simple uncomplicated fractures of the tibia and fibula. For this purpose I wrote to every patient who had been treated for a fractured tibia or fibula at the David Lewis Northern Hospital during the last five years, and I regret to say that the number of patients who responded to my request to attend at the hospital bore a very small proportion to the number of post-cards sent. However, I succeeded in finding at their own homes many of those who did not come, and although the numbers thus obtained are comparatively small the results are interesting and, I think, well worth consideration. As the majority of these patients were not under my own care I have to thank my colleagues, Mr. Chauncy Puzey and Mr. Damer Harrisson, for kindly allowing me to make use of their cases and I am pleased to have this opportunity of expressing my great obligation to Mr. Arthur N. Walker and Mr. C. Thurstan Holland for the time and trouble which they have taken in furnishing me with the x-ray photographs.

In the hospital where these cases were treated, situated as it is close to the Liverpool Docks, we have to deal with a large number of fractures (about 350 annually) and as we therefore have a somewhat exceptional experience in the treatment of broken legs I hope that I am justified in assuming that the results obtained are at least equal to the average results obtained elsewhere.

What, then, do these results amount to? I have succeeded in learning the after-results of 76 cases and a brief account of each case is given in the appended table. In almost every instance the patient was an adult male and the fracture was a so-called simple fracture and not complicated by a wound of the big blood-vessels, by a dislocation, or by a joint being involved, except, of course, in some of the cases of Pott's fracture. I have only included a few fractures in females because I wished to ascertain how far a man's wage-earning capacity was interfered with after a simple fracture of the tibia and fibula; in other words, how long he would be off work and how far he would be able to resume his former employmemt. This will, of course, depend very largely upon the man's trade. The after-result might be entirely satisfactory if he is a tailor or a dock labourer and works on the flat, but the same result may be by no means satisfactory if the man is a sailor, an Everton forward, or a steeplejack. Whether we do or whether we do not, my belief is that we should be able in the majority of cases so to mend a broken leg that whatever a man's trade is he will subsequently be able to follow it.

The depreciation in the wage-earning capacity of a labouring man after he has sustained an oblique fracture of the lower third of the tibia is said to be considerable and has been estimated at being somewhere between 40 and 60 per cent. I am pleased to find that the results obtained at the David Lewis Northern Hospital, judged by these standards, have been very creditable. But however creditable these results may be I sincerely hope that in the future they may be infinitely better, as I firmly believe they should be.

Why is it that at the beginning of the twentieth century we are not able to mend broken legs better than we do? I believe that it is in a great measure owing to the fact that in hospitals fractures, as a rule, do not excite much interest, at all events not to be compared to the interest excited in treating a cancer of the pylorus or a cerebral tumour. But surely it is better completely and permanently to restore the utility of a broken limb of a healthy man than to prolong the life of a cancerous patient for a few years. Owing chiefly to the introduction of antiseptics the advances in abdominal and cerebral surgery have, even in my own time, been little short of marvellous, but the treatment of simple fractures at the beginning of this century is very much the same as it was at the beginning of the last. So far as I have been able to ascertain, if a man with a simple fracture of the tibia and fibula, whether the fracture is oblique or not, be admitted into any hospital in England, the great probability is that after the fracture has been "set," with or without an anæsthetic as the case may be, the limb is fixed in a back splint with a vertical foot-piece and side splints. I am perfectly well aware that other methods of splinting are employed, but the one which I have mentioned is, I believe, the most usual one.

I do not know whether any practising surgeons have ever had the curiosity to try the ordinary back splint with the vertical foot-piece on themselves, but I have and have found the

TABLE SHOWING THE ULTIMATE RESULTS IN 76 CASES OF FRACTURE OF THE TIBIA AND FIBULA.

No.	Age in years.	Date of admission to hospital.	Fracture.	Length of stay in hospital.	Period off work.	Result and remarks.
1	55	January, 1897.	Pott's.	5 weeks.	1 year.	Very unsatisfactory; the patient walks with a stick and is unable to resume his former work of carter.
2	55	April, 1897.	Tibia and fibula (lower third, oblique).	5 ,,	11 months.	Patient working as before (boiler-maker).
3	61	,,	Tibia and fibula (lower third).	3 ,,	6 ,,	,, ,, (porter).
4	45	July, 1897.	Pott's.	3 ,,	7 ,,	Patient not able to resume former work.
5	38	August, 1897.	Pott's.	4 ,,	4 ,,	Patient working as usual (coal-heaver).
6	37	,,	,,	4 ,,	2 ,,	,, ,, (labourer).
7	50	September, 1897.	Tibia and fibula (middle third).	6 ,,	?	Patient working as before, but lighter work as he cannot walk far (carter).
8	57	October, 1897.	Tibia and fibula (lower third, oblique).	6 ,,	6 months.	Patient working as before (porter).
9	27	,,	Pott's.	5 ,,	4 ,,	,, ,, (carter).
10	47	November, 1897.	Tibia and fibula (lower third, oblique).	8 ,,	4½ ,,	,, ,, (driver).
11	45	January, 1898.	Fibula (lower fourth).	7 ,,	4 ,,	,, ,, (labourer).
12	39	January, 1898.	Tibia and fibula (compound).	8 ,,	?	,, ,, (polisher).
13	30	,,	Pott's.	4 ,,	2 months.	,, ,, (labourer).
14	28	February, 1898.	,,	5 ,,	4 ,,	Patient resumed former work (fireman) but limps, and ankle is painful.
15	48	March, 1898.	Tibia and fibula (lower third).	4 ,,	7 ,,	Patient working as before (labourer).
16	53	May, 1898.	Tibia and fibula.	8 ,,	5 ,,	,, ,, (stage-man).
17	65	,,	Tibia and fibula (lower third).	6 ,,	5 ,,	Patient cannot go aloft as a rigger; working as a labourer.
18	30	July, 1898.	Tibia and fibula (lower third, oblique).	4 ,,	3 ,,	Patient working as before (warehouseman). The seat of the fracture is distinct and some overriding of the tibia is present; there is slight shortening but not sufficient to cause lameness.
19	60	,,	Tibia (lower third).	4 ,,	5 ,,	Patient working as before (carter).
20	32	,,	Pott's.	3 ,,	3 ,,	Patient working as usual (labourer).
21	49	,,	,,	3 ,,	3 ,,	Patient working as before (overseer).
22	33	August, 1898.	Tibia (lower third).	6 ,,	3 ,,	,, ,, (porter).
23	38	,,	Tibia and fibula lower third, comminuted).	10 ,,	10 ,,	Patient working as before (mason). His foot swells after the day's work.
24	38	September, 1898.	Tibia and fibula (lower third).	4 ,,	3 ,,	Patient working as before (foreman).
25	22	,,	Pott's.	3 ,,	3 ,,	,, ,, (coal-heaver).
26	59	November, 1898.	Tibia and fibula (lower fourth).	5 ,,	3 ,,	,, ,, (sailmaker).
27	23	,,	Internal malleolus.	4 ,,	3 ,,	,, ,, (labourer).
28	21	,, ,,	,, ,,	5 ,,	4 ,,	,, ,, ,,
29	26	December, 1898.	,, ,,	4 ,,	3 ,,	,, ,, ,,
30	19	,,	Tibia and fibula (lower third).	4 ,,	3 ,,	,, ,, ,,
31	50	,,	Tibia and fibula.	6 ,,	4 ,,	,, ,, (coachman).
32	30	February, 1899.	Tibia and fibula (lower third, oblique).	5 ,,	?	Five months after the accident the patient was in the workhouse; leg and ankle swollen; unable to put foot to ground; walking with crutches.
33	61	,,	Pott's.	4 ,,	7 months.	Patient not able to resume former work as carter.
34	22	,,	,,	3 ,,	2 ,,	Patient working as before (labourer).
35	33	March, 1899.	Tibia and fibula (lower third, oblique).	5 ,,	4 ,,	Patient walks fairly well, but with a limp; some overriding of fragments. Working as before, but leg painful after a heavy day's work (labourer).
36	26	April, 1899.	Tibia.	3 ,,	3 ,,	The seat of fracture is distinct at the lower third of the tibia. Result is very satisfactory, the patient working as before (labourer).
37	49	May, 1899.	Tibia and fibula (lower third, oblique).	6 ,,	8 ,,	There is considerable callus at the seat of the fracture. Patient not yet able to work, walking with a stick. (November, 1899.)
38	21	,,	Tibia and fibula (middle third, comminuted).	5 ,,	5 ,,	Patient not able to resume former work of mounting ladder and carrying bricks. Is working as a dock-labourer.
39	25	,,	Tibia and fibula (lower third, oblique).	5 ,,	8 ,,	Patient not able to resume work as leg is swollen and painful. X-ray photograph shows obliquity of fracture (labourer).
40	38	,,	Pott's.	4 ,,	4 ,,	Patient working as before (labourer).
41	17	June, 1899.	Tibia.	8 ,,	4 ,,	,, ,,
42	31	July, 1899.	Pott's.	3 ,,	2 ,,	,, (window cleaner).

TABLE SHOWING THE ULTIMATE RESULTS IN 76 CASES OF FRACTURE OF THE TIBIA AND FIBULA—(*Continued*).

No.	Age in years.	Date of admission to hospital.	Fracture.	Length of stay in hospital.	Period off work.	Results and remarks.
43	26	July, 1899.	Tibia and fibula (lower third, oblique).	3 months.	8 months.	As no union had occurred a month after admission an operation was performed, the ends of the tibia being resected and fixed in position by means of a plate with screws which was removed a month later. Result very satisfactory; the patient is working as before, and can go up and down stairs easily; the movements of the ankle are free.
44	21	August, 1899.	Tibia and fibula at junction of middle with lower third.	8 weeks.	6 ,,	Patient was admitted in first instance on May 1st, and as no union occurred he was re-admitted on August 5th; the ends of the bone were exposed and screwed. Utility of the limb was perfect. He has resumed his former work (bargeman).
45	16	November, 1899.	Tibia and fibula (lower third, oblique and compound).	3 months.	4 ,,	When the patient was brought to hospital the lower end of the upper fragment was projecting through his trousers. Operation was performed on the same day, the ends of the tibia being united with wire. The result is very satisfactory, the outline of the bone being good. He can walk and run as well as before.
46	27	,,	Pott's	1 month.	3 ,,	Patient as before (coal-heaver); the movements of the ankle are free. Some thickening of external malleolus is present. Doubtful if true Pott's fracture.
47	33	December, 1899.	Tibia and fibula (lower third).	1 ,,	7 ,,	Patient has resumed his former work (carter). No obvious deformity is present. He walks well.
48	42	January, 1900.	Tibia about the middle.	50 days.	5 ,,	Patient working as before (dock labourer). He can go upstairs without pain. His leg as useful as before.
49	38	February, 1900.	Pott's.	38 ,,	9 ,,	Much thickening of external malleolus is present. Patient is working as before (labourer), but not yet full time as the ankle swells and is painful (January, 1901).
50	56	,,	Tibia and fibula (lower third, oblique).	2½ months.	8 ,,	Much callus exists at the seat of the fracture and the leg is bent slightly outwards. Patient is working as before (labourer), but he cannot go upstairs without pain (January, 1901).
51	24	March, 1900.	Tibia and fibula (lower third, oblique).	6 weeks.	7 ,,	There is marked projection of the lower end of the upper fragment. The patient walks well and the leg is quite useful, but the leg and ankle swell at night (January, 1901).
52	60	,,	Pott's.	1 month.	3 ,,	Patient working as before (coal-heaver). Some flatfoot and pain in leg and foot are present after a day's work (January, 1901).
53	55	May, 1900.	Dislocation of astragalus and fractured fibula.	5 weeks.	6 ,,	The astragalus was reduced under chloroform. In January, 1901, the general appearance of the foot was normal and movement of the ankle was good. The patient was working well and could work as before, but slack time (labourer).
54	44	,,	Tibia and fibula (lower third oblique).	65 days.	Not yet able to work (13/1/01).	Patient was a heavy man. The fracture was a bad one, with much swelling and bruising. A large bulla formed. He had been drinking. Slight delirium tremens was present. In January, 1901, he was walking with a stick. There were considerable swelling of the leg and much thickening at the seat of the fracture. The movements of the ankle were impaired.
55	23	June, 1900.	Pott's.	4 weeks.	3 months.	Patient working as before (labourer). Some thickening of external malleolus is present.
56	37	July, 1900.	Pott's.	15 days.	10 weeks.	Patient working as before (waterman). There is thickening of the external and also of the internal malleolus. The position of the foot is good and he walks well.
57	42	,,	Tibia and fibula (lower third, oblique).	5 weeks.	Not yet able to work. (19/6/01.)	The lower end of the upper fragment projects inwards. Considerable callus is present. The ankle is painful and swells at night. The patient walks with difficulty.
58	32	August, 1900.	Pott's.	25 days.	Not yet able to work. (20/1/01).	Patient cannot resume former work as dock labourer. He walks badly and suffers much pain in ankle which swells at night. He cannot go upstairs. A month ago he bought a small cart and tries to earn a living (January, 1901).
59	48	,,	Tibia (about middle).	27 ,,	8 weeks.	Patient working as usual (labourer). Considerable callus is present, which, however, is well above the tendons.
60	39	,,	Tibia and fibula (lower third, oblique).	38 ,,	Not yet able to work (17/2/01).	Patient is a boiler-maker. The outline of the limb is fairly good, but the lower end of the upper fragment projects inwards. The foot and leg swell at night time. He walks with difficulty.
61	51	October, 1900.	Tibia and fibula (lower third).	5 weeks.	3 months.	Patient walking with a limp (January, 1901) but gets about fairly well without any support. There is still some swelling at the seat of the fracture. She cannot get her boot on.
62	32	November, 1900.	Tibia (about middle).	4 ,,	2 ,,	Patient has resumed his former work (water inspector). The result is perfect as regards function. Marked callus is present at the seat of the fracture which, however, is well above the tendons.
63	45	December, 1900.	Tibia (middle and also lower third).	6 ,,	11 ,,	The seat of the double fracture is distinct. Much callus is present. The outline of the limb is good. The patient walks as well as ever and has resumed his former work (dock labourer).
64	17	January, 1901.	Tibia and fibula (about middle).	4 ,,	8 ,,	Patient walked too soon after his discharge and the tibia bent forward. He was re-admitted in April, 1901, and was operated upon by Mr. Harrisson, the end of the bone being screwed. The final result is excellent as regards function of the limb which is as useful as ever. There is much callus which, however, is well above the tendons. He has resumed his former work (labourer).
65	36	March, 1901.	Tibia and fibula (lower third, oblique).	10 ,,	9 ,,	In May, 1902, the patient had been walking for about five months. Now there is considerable limp, the heel is drawn up, and she has to wear cork inside her boot. The foot and ankle are swollen. The seat of the fracture is distinct, the lower end of the upper fragment projecting inwards.

TABLE SHOWING THE ULTIMATE RESULTS IN 76 CASES OF FRACTURE OF THE TIBIA AND FIBULA—(*Continued*).

No.	Age in years.	Date of admission to hospital.	Fracture.	Length of stay in hospital.	Period off work.	Result and remarks.
66	36	April, 1901.	Tibia (about middle).	2 weeks.	1 month.	The seat of the fracture is distinct. The patient is walking with a slight limp. Considering how early she walked the result is good (May, 1902).
67	51	,,	Tibia and fibula (lower third, oblique).	8 ,,	7 months.	As the fracture was oblique and x-ray photograph showed bad position the operation was performed on April 24th, 1901. The ends of the bone were exposed and screwed. The result is very satisfactory. The patient walks well and has resumed his former work (labourer).
68	32	,,	Tibia and fibula.	4 ,,	3 ,,	The lower end of the upper fragment projects. The patient has a useful leg and walks with a slight limp. Pains are present in the leg and foot. The ankle swells at night (May, 1902).
69	30	May, 1901.	Tibia and fibula, (lower third, oblique).	6 ,,	3 ,,	The position of the fragments is unsatisfactory, but the patient declined operation. On July 14th, 1902, the patient was walking well and without limp or pain; the movements of the ankle were free. The seat of the fracture was distinct and marked. The bone end of the upper fragment projected inwards. There was a considerable amount of callus. The leg for all ordinary purposes was as good as it was before the accident.
70	14	,,	Tibia and fibula (long and spiral-shaped fractures).	9 ,,	7 ,,	While the patient was in hospital much swelling of the leg was present and it was feared that the result would not be good, though the position of the fragments as shown by an x-ray photograph was fairly satisfactory. In May, 1902, the leg was still slightly swollen but he walked well and could run without pain or limp.
71	35	,,	Internal malleolus.	5 ,,	5 ,,	There was marked thickening of the internal malleolus. The results were very satisfactory. In May, 1902, the patient was working as before (labourer).
72	35	June, 1901.	Tibia and fibula (lower third, oblique).	6 ,,	8 ,,	Patient walks with a marked limp and is not able to do heavy work, as the leg is weak and the ankle is painful. Getting upstairs is difficult. The lower end of the upper fragment projects (May, 1902).
73	16	July, 1901.	Tibia, just below the middle (transverse).	7 ,,	4½ ,,	Patient working as before (engine-cleaner) and the limb is as useful as ever. There is not much callus, which is above the tendons (May, 1902).
74	32	,,	Tibia (lower one-fourth, oblique).	19 days.	6 ,,	Patient walks well and without a limp. The limb quite useful for ordinary purposes but he cannot run. He has resumed his former work as a groom. The lower end of upper fragment projects inwards. The leg swells after long standing and some pain is present in the sole of the foot (June, 1902).
75	25	November, 1901	Internal malleolus.	6 weeks.	3 ,,	Patient working as before (carter). He suffers no pain or inconvenience from the fracture (May, 1902).
76	19	December, 1901	Tibia and fibula, at the junction of the middle with the lower third.	5 ,,	6 ,,	Much callus is present at the seat of the fracture and the lower end of the upper fragment projects inwards. He walks well and without any limp and says that his leg is quite strong and useful. He has resumed his former work of stage-porter.

position a forced one and uncomfortable. A forced one for the reason which Mr. Lane was one of the first to point out—namely, that when a person is lying on his back the natural tendency is for the feet and legs to rotate slightly outwards. What then happens when we apply this splint for a fractured tibia and fibula? The foot is securely fixed to the vertical foot-piece and prevented from rotating outwards, but the limb above the point of fracture not being so securely fixed does rotate slightly outwards and so the broken ends of the bone are not in accurate apposition. Nor is this all; an endeavour is also made to bring the heel in contact with the foot piece (fortunately it is difficult to keep it there) and the calf muscles thus being put on the stretch any slight overriding of the broken fragments is necessarily increased. In the majority of cases we have the other un- injured limb as a guide, why not then endeavour to imitate the natural position of rest as far as possible?

The form of splint which I have found most generally useful for fractures of the tibia and fibula, including cases of Pott's fracture, is a back splint with a foot-piece, but this foot-piece instead of being vertical is inclined outwards to an angle of 70° and with the same inclination forwards. A splint so shaped permits of the foot and leg being fixed in the natural position of rest. The patient is more comfortable in a splint of this description and as no endeavour is made to force the foot into an unnatural vertical position there is much less tendency to the formation of a sore over the heel. Moreover, the tendo Achillis not being in a state of passive tension (as is the case when the vertical foot-piece is used) the tendency to overriding of the fragments is lessened.

The leg-piece of this splint should be of such a length as to permit of the knee being bent and, after the applications of side splints, to allow the leg and splint to be swung from a cradle. When the fractured bone has firmly united, say at the end of four weeks, movements of the ankle- and knee-joints should be encouraged, and massage practised if available. The mistake usually made is keeping the injured limb in a state of immobility for too long a time. If the fracture has been an oblique one it should be remembered that the newly-formed callus will have to bear the strain of the body-weight, and consequently will be apt to "give" if the patient rests the full weight of his body on the injured limb before the end of the third month.

But whatever form of splinting is employed I feel sure that in a certain proportion of cases of simple fracture of the tibia, more especially when the fracture involves the lower one-third of the bone and is of the oblique or spiral character, try as one will, even with the patient under the influence of an anæsthetic, one will fail to obtain a satisfactory apposition of the broken ends of the bone, because it is practically impossible by splints alone to get the broken ends in accurate position and to keep them there. If anyone doubts the accuracy of this statement let him have an x-ray photograph taken of such a fracture after the splint has been applied. I wish this was much more frequently done than it is at present, and when there are facilities for doing so I would suggest that it be always done in doubtful cases.

What is it that prevents the replacement of the fragments? After some experience in operating upon these cases, I feel sure that Mr. Lane is correct when he says: "Spasmodic muscular contraction affords a very slight and transitory obstacle to the replacement. It can be measured and placed in abeyance for the time being by putting the patient under an anæsthetic. In simple oblique fractures the chief obstacle to replacement of the fragments in accurate apposition is hæmorrhage into, and inflammation of, the soft parts." And I would add another factor occasionally

met with—namely, the piercing of adjacent muscles and fascia by the sharp ends of the broken bone.

I take it that all surgeons are agreed that the more completely a fracture is reduced the better; and there can, I think, be no doubt that if "accurate apposition" of the broken ends of the bone is essential in order to restore the complete and perfect utility of the injured limb the logical

FIG. 1 (CASE 76).

Simple fracture about the middle of the tibia and fibula. Skiagram taken at the time of the accident.

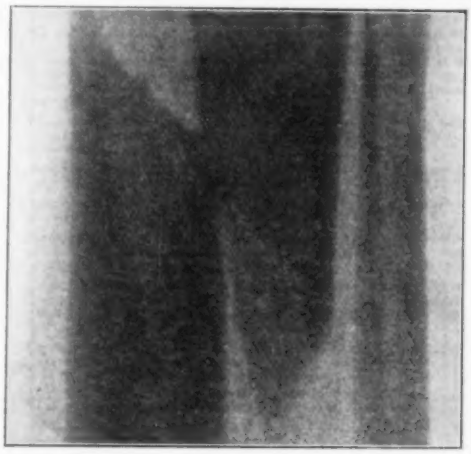
FIG. 1A.

After recovery. No operation; useful limb.

conclusion must be to cut down upon, and to expose, the broken ends in the vast majority of cases. But is such a procedure either necessary or justifiable? For my own part I have no hesitation in saying, Certainly not. Any surgeon who has really interested himself, not only in the immediate treatment of fractures, but who has also followed his cases to a conclusion, must realise that although it is practically impossible, for reasons which I have mentioned, to obtain by any means short of operative interference accurate apposition of the broken ends of the bone, still, clinically, the results in many such cases have been perfect even when the line of fracture has been of some obliquity. At the same time I am sure, speaking as a hospital surgeon with a labouring man as a patient, that there is a considerable number of cases in which operative treatment is not only justifiable but urgently called for.

In deciding for or against an operation in any individual case the employment of the patient and the position and

FIG. 2 (CASE 66).



Before operation.

FIG. 2A.

After operation.

character of the fracture as determined by the x rays should be carefully considered. As regards the position of the fracture, if it is situated in the upper two-thirds of the tibia—namely, that part of the bone above the position of the tendons—operative interference is seldom called for. If, on the other hand, the lower one-third of the bone is involved and the fracture is oblique or spiral-shaped, I would suggest that if after the fracture has "set" one-half or more of the fractured surfaces are in contact, and provided that there is no rotatory displacement, an operation is

not called for in the majority of such cases, but if these conditions cannot be obtained the broken ends should be exposed and fixed securely and accurately together. Though undoubtedly there are cases in which the x rays, if they are to be trusted, clearly demonstrate not only an oblique fracture involving the lower one-third of the tibia but also show that considerably less than one-half of the fractured surfaces are in contact, and yet the patients have recovered with the utility of the limb restored, still I am convinced that such recoveries are the exception. I have a photograph of a fracture which is an excellent illustration of this point. (See Fig. 1 and 1A.)

In cases of a doubtful nature the employment of the patient will probably turn the balance for or against an operation. A leg with its utility slightly impaired might still serve all the purposes of a tailor, but the same degree of deficiency would render it useless to a postman. At the same time it would be idle to deny that there are certain risks in operating, for although it would appear to be a simple enough procedure, judging from the x-ray photograph, still the actual operation is often one of considerable difficulty. A very free incision is advisable and the chances of sepsis will be considerably diminished if the operator and his assistant keep their fingers from contact with the wound. I do not propose to deal with compound fractures of the tibia, but cannot refrain from mentioning that the results are frequently much better than after a simple fracture, no doubt owing to the wound relieving the soft parts of extravasated blood and inflammatory products. Further, the practice, which I presume is now universal, of enlarging the wound for cleansing purposes permits of a view of the actual position of the bones—strong arguments, by the way, in favour of operating for simple fracture. (See Fig. 2 and 2A.)

Passing now to the consideration of the cases of so-called Pott's fracture. I say "so-called" advisedly, for in many cases that are diagnosed as Pott's fracture the injury sustained is by no means so severe as at all to answer to the original description of Mr. Percival Pott. And this criticism would probably apply to several of the cases in the appended table. Here, again, I maintain that the x rays should be frequently employed, for in a few hours the swelling of the foot and ankle makes it practically impossible correctly to estimate by ordinary means the exact nature of the injury and the relative position of the broken bones.

From x-ray photographs which I have had taken of Pott's fracture I would say that the usual defect remaining after reduction is a slight displacement outwards and backwards. The form of splint which I have already suggested will be found especially useful for this class of fracture, for if the foot is forced into a vertical position the tension on the tendo Achillis will tend to exaggerate the already slight displacement of the foot backwards. When a fracture is close to a joint early passive movement and massage are of great importance, and after a Pott's fracture this line of treatment should be adopted at the end of the third week. I have never considered it necessary to operate upon these cases and feel sure that the indications for doing so must be very exceptional.

It only remains for me to say, in conclusion, that I have personally investigated the after-results in every case here recorded, which although a somewhat troublesome procedure is, I believe, infinitely better than collecting the mere general impressions of others, for general impressions are apt to be somewhat misleading; and if my small effort will only induce surgeons to take more interest in their cases of fractures, and so bring this branch of surgery more in a line with the general surgical advance, I shall be satisfied.

Liverpool.

AN UNRULY WORKHOUSE INMATE.—At the meeting of the Warminster board of guardians held on August 25th a discussion arose about a workhouse inmate who had assaulted the master and porter and had threatened "to swing for the medical officer." The man had been sentenced to four months' imprisonment, but as he was destitute the chairman said that he would probably return to the workhouse at the expiration of his sentence. It was decided to write to the Local Government Board asking if the Board would sanction any exceptional treatment in regard to the man, as the guardians felt that they must protect their officers whilst discharging their duties.

THE CHOICE OF AN ANÆSTHETIC FOR SHORT OPERATIONS UPON THE THROAT AND NOSE.[1]

BY J. HENRY CHALDECOTT, L.R.C.P. LOND., F.F.P.S. GLASG.,

ANÆSTHETIST TO THE METROPOLITAN THROAT AND EAR HOSPITAL AND ITALIAN HOSPITAL; LATE ASSISTANT ANÆSTHETIST TO THE CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL.

By short operations I mean those which can be performed during the time which elapses between the removal of the anæsthetist's mask and the patient's return to consciousness. The most common of these are tonsillotomy and the removal of adenoids; posterior and anterior turbinectomy; removal of nasal spurs and polypi; and draining the antrum of Highmore through the alveolus. The anæsthetic agents which we have to choose from are chloroform, A.C.E., and C.E. mixture; nitrous oxide, nitrous oxide and oxygen; nitrous oxide and ether; ether; and chloride of ethyl.

TONSILLOTOMY AND REMOVAL OF ADENOIDS.

The enormous number of these operations now performed renders the choice of a suitable anæsthetic a very important matter. The operation *per se* entails no immediate risk to life, and one can hardly conceive the possibility of a patient dying on the table or in the chair if operated upon without an anæsthetic. It follows, then, that any fatalities which have occurred have been caused by the anæsthetic employed, and so far as I have been able to ascertain the anæsthetic has in every recorded case been chloroform or some mixture containing chloroform. I have collected a list of more than 50 recorded deaths under chloroform given for this operation, including children and adults; cases in which the chloroform was given by specialists in anæsthetics and cases in which it was administered by general practitioners and house surgeons; cases of death at all stages of the procedure, before the commencement of the operation, during the operation, and after its completion. Now this list lays no claims to being exhaustive and could probably be largely increased. What, then, is the obvious deduction? That here we have an operation which ought to be, and is in itself, absolutely free from immediate danger, perverted by the use of chloroform into one of the most immediately deadly of any in the long list of surgical operations. Is there any one surgical operation—major or minor—which can claim such a record of deaths upon the table? I doubt it. Could any or all of these fatalities have been avoided? I think so, and how? by avoiding the use of chloroform. In 1897 in a paper read before the British Medical Association by Dr. Waller, the author remarked: "I am greatly astonished that, in the face of the clinical experience of the last 50 years, chloroform should still be employed for the purposes of minor surgery." These words were spoken in 1897 and since then more than 30 *recorded* deaths from chloroform have taken place during adenoid operations only.

Now, what was the cause of death in these cases? In a small percentage of the cases blood was found post mortem in the larynx, trachea, and bronchi, death having been apparently due to this cause; but in the majority no such cause was discovered and the patients had apparently succumbed to an overdose of chloroform; and it is easy to appreciate, firstly, that "adenoid" subjects, whose intake of oxygen is already insufficient, are very likely subjects to be poisoned by chloroform; and, secondly, that a gasping and coughing patient, with perhaps his mouth half-full of blood, is quite likely, if the chloroform is continued during the operation, to get a very intermittent supply—none one inspiration and perhaps a deadly dose the next. With reference to those who died from blood in the air passages we may be told that these accidents would not have happened if the chloroform had not been pushed far enough to abolish the cough reflex. Quite so, but it is by no means easy in all cases to know exactly when anæsthesia has arrived at that particular point, and with chloroform one is also met by the difficulty that the patient may pass into deeper anæsthesia after the removal of the mask. I do not dispute that a

[1] A paper read at the Metropolitan Throat, Nose, and Ear Hospital.

longer anæsthesia after the removal of the mask can be obtained with chloroform than with any other anæsthetic, but I maintain that in order to obtain that increase of time the drug must be pushed to the extent of abolishing the cough reflex or perilously near it, and that an anæsthesia which stops short of that point has no advantage whatever over ether narcosis and is infinitely more dangerous.

What, then, are the alternative methods? Infants aged less than 12 months should be given ether on an open mask. Children from one to four years of age do not take N_2O well, especially if they have large tonsils, but, as a general rule, they take ether without any trouble at all from a Clover's inhaler, with or without the bag, according to the ease with which they go under. For children from four to 12 years of age N_2O will generally do, but if when pressed it causes much jactitation and rigidity it is better to give a little ether. In adolescents and adults the operation can be done under gas alone in most cases; indeed, a rapid operator will frequently remove in the time allowed by N_2O anæsthesia tonsils, adenoids, and the posterior ends of the inferior turbinals. What a rapid operator will do under gas only an average operator will do easily under gas and ether.

Gas and oxygen is perhaps slightly better than gas or gas and air, but for these operations the apparatus is rather inconvenient, and, as a matter of fact, we find that gas or gas and ether meet our demands. The purified chloride of ethyl used as a general anæsthetic is still under trial, but from the results I have had in about 80 cases I doubt if it has any advantage over ether, and it is certainly less trustworthy and more tedious to administer.

What do the critics of these methods say? Their first objection is that the operation cannot be satisfactorily and completely done under this form of anæsthesia. Now, this method has been in vogue at the Metropolitan Throat, Nose, and Ear Hospital and at the Central London Throat Hospital for 12 years, during which time 20,000 cases have been so operated upon. Is it seriously suggested that the surgeons attached to these two hospitals have not learnt in 12 years whether or not they can clear a naso-pharynx of tonsils and adenoids in the time allowed by a gas or gas and ether anæsthesia? If at these hospitals these operations were habitually only half done would there not be an ever-increasing back-flow of recurring cases? As a matter of fact, the percentage of recurrences is very small and certainly not greater than that of cases done under chloroform elsewhere. The second objection which is raised is that gas and gas and ether cause more hæmorrhage than chloroform. Even supposing that they do so, unless it can be shown that they cause *dangerous* hæmorrhage the objection ought not to be taken into account against the risk to life which I have shown is entailed by the employment of chloroform, but, personally, I believe the objection to be purely fanciful. I can only say that amongst the several thousands of these operations which I have seen and assisted at I have never seen a case of alarming or even of serious hæmorrhage. We are told that while chloroform kills on the table, ether kills by its after-effects, and with prolonged administrations this is doubtless sometimes true; but the objection does not, of course, apply to short inhalations of ether such as are employed for the operations in question.

Gag.—The best gag for these cases is certainly Doyen's, and it should be applied before the administration of the anæsthetic.

Position.—For gas or gas and oxygen the sitting position is very much the best. For ether or gas and ether some surgeons prefer the recumbent position, and it is not a matter of much importance. From an anæsthetist's point of view I prefer the sitting position as being more cleanly and as obviating the necessity of using mops or sponges.

The other operations on the list can all be done under gas, gas and oxygen, or gas and ether, and there is never any necessity for the use of chloroform.

In conclusion, I should like to explain that I do not suggest that the methods which I here advocate are confined to the two hospitals named; I only quote them because I have personal experience of their work and access to their records. Nor do I wish to be misunderstood in my attitude towards chloroform, which in suitable cases I regard as *facile princeps* of anæsthetics. The points that I wish to emphasise are: (1) chloroform has been the means of destroying more than 50 lives during adenoid operations and cannot, therefore, be regarded as other than a *dangerous* anæsthetic in this particular class of case; (2) at least five of these deaths have occurred in the practice of anæsthetists of the highest possible skill and experience; and (3) thousands of these operations are performed every year under gas and gas and ether without a single death and with hardly an anxious moment. In view of these facts, are we justified in subjecting patients to the absolutely unnecessary risk of chloroform anæsthesia? I think decidedly not.

Welbeck-street, W.

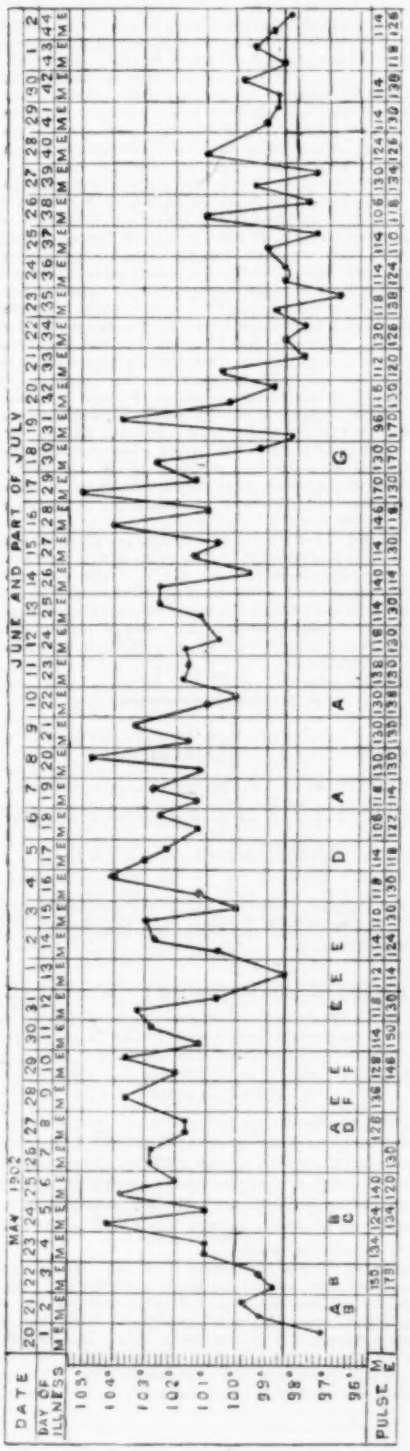
A CASE OF TRAUMATIC RUPTURE OF THE SPLEEN; REMOVAL FOLLOWED BY EMPYEMA AND RECOVERY.

BY EDGAR BEAUMONT, L.R.C.P. LOND., M.R.C.S. ENG.,
SURGEON TO THE NORWOOD COTTAGE HOSPITAL;
AND
EDWARD HOUSEMAN, M.B., B.C. CANTAB.,
LATE HOUSE SURGEON TO ST. GEORGE'S HOSPITAL.

THE patient was a youth, aged 17 years, who was brought into the Norwood Cottage Hospital, on the evening of May 20th, 1902. There was a history of his having fallen from a wagon, one wheel of which passed over his body. On examining the youth we found that he was suffering great pain in the left loin. There was a bruise over the ninth and tenth ribs in the posterior axillary line of the size of the palm of a man's hand. His temperature was 97·6° F., his respirations were 24, and his pulse was 100. His breathing was not markedly thoracic and there was an absence of rigidity of the abdominal muscles. There was no evidence of fractured ribs, but there was dislocation of the acromial end of the clavicle and a fracture across the infra-spinous fossa of the scapula with a large hæmatoma under the bone. A few hours after admission the boy became very restless and the distension of the abdomen, with loss of liver dulness, brought forcibly to our minds the fact that there was severe abdominal lesion and decided us to open the cavity without delay. Chloroform and ether were administered and we were then able to feel distinctly a loose body in the left hypochondrium which we took to be, and which ultimately turned out to be, a portion of the spleen. In consequence of the loss of liver dulness we thought it likely that there might be intestinal injury as well, so we decided on a median incision.

We made a free incision in the middle line and on opening the peritoneum found the cavity full of blood-clot. In addition there was a welling up of blood, showing that active hæmorrhage was still going on. There was no free gas in the cavity. On pressing the hand into the cavity the spleen was instantly felt to be in two pieces, and on finding and holding the vessels between the finger and thumb the hæmorrhage was controlled. The spleen was then drawn forward to the surface, the pedicle was clamped, and after separating the tail of the pancreas from the hilum was transfixed, tied, and divided and the spleen removed. The abdominal cavity was then flushed with several gallons of hot sterilised water and the abdomen closed. There was considerable ecchymosis of the intestines.

The patient by this time had become very collapsed, so 15 minims of liquor strychniæ were injected hypodermically before he was removed from the table and hot salt-water injections per rectum with five minims of liquor strychniæ hypodermically were continued every three hours during the night. Next morning we found the patient fairly comfortable; the pulse, which had been 160 after the operation, had come down to 120. He had not vomited, but there was still absence of liver dulness and the patient lay on his back with his knees drawn up. He was unconscious and moaned incessantly. His temperature was 101·5°. He remained in much the same condition until the third day after the operation, when his temperature suddenly shot up to 105°. He became violently delirious, restless, and sweated profusely; there was diarrhœa and urine was passed under him, so we decided to dress the wound, which we found apparently healthy. The abdomen was slightly distended but moved freely and did not seem tender. On the sixth day after the operation we found some fluid effused at the base of the left lung, so we aspirated and removed six ounces of decomposing blood with an almost fæcal smell. As there had been no



A, Operations, first, second, third, and fourth. B, Hypodermic injection of morphia. C, Tepid sponging. D, Aspiration of fluid. E, Injection of anti-streptococcic serum. F, Stitches removed. G, Irrigation. Temperatures were taken every four hours; only those taken at 10 A.M. and 10 P.M. are shown in this chart.

fracture of ribs at the time of the accident we concluded that this had probably come through the diaphragm from the abdominal cavity, and so we decided to explore the subdiaphragmatic region.

With this object we made an incision in the loin from behind forwards, the centre of the incision being over the angle of the eleventh rib. We resected the lower ribs and so were enabled without difficulty to examine the stump of the spleen. Not finding any pus we closed the opening. On this we concluded that septicæmia was the cause of his high temperature and general condition, so we made an examination of the blood and found streptococci in large numbers. We therefore commenced the hypodermic injection of anti-streptococcic serum and gave him 90 cubic centimetres with little effect on his temperature, and within four hours he developed a very large pleural effusion on the left side only, the dulness extending up to the clavicle, so we aspirated and withdrew two pints of fluid slightly blood-stained and sweet. We continued the injection for four days, during which time we used 330 cubic centimetres of the serum. On the morning of the fifth day after these injections had been commenced the temperature came down to normal and the patient was quite conscious for the first time for nine days. All the wounds, including the hypodermic punctures, became about this time septic in spite of anti-septic dressings, so we swabbed the worst of them with pure carbolic acid. After this treatment they cleaned up very much. On June 5th, 15 days after the original operation, we found signs in the left chest about the angle of the scapula of a localised empyema, so we aspirated and found pus and subsequently resected considerable portions of the seventh and eighth ribs. There was free discharge of pus for several days, but the temperature remained high, reaching 104° and 105° daily. The cavity was washed out with a weak solution of lysol and remained sweet, but as the temperature remained high we decided to try the effect of the frequent application of pure oxygen through a tube passed into the pleural cavity. This treatment was attended by the most satisfactory results. The temperature came down to normal, the discharge ceased, and a general repair commenced in all the wounds. With the exception of the wound leading into the pleural cavity all are now healed; this is rapidly closing and the lung is expanding well and filling the cavity. The patient is in good general condition, eats and sleeps well, and spends his time in the garden.

Remarks.—The following points are of interest in this case. 1. The absence of collapse and comparative slowness of pulse in so severe an abdominal injury. 2. That since the removal of the spleen the pulse has never come below 112, although the patient is now in comparatively good health. 3. We have noticed that since the removal of the spleen there has been marked general enlargement of lymphatic glands with anæmia. 4. The very slight reaction to exceptionally large doses of anti-streptococcic serum, although to get different strains we obtained it from different sources. 5. The extraordinary general and local improvement which took place at once on the application of oxygen to the pleural cavity.

Addendum.—At this date (Sept. 8th) the patient is perfectly recovered and is to all appearances in as good health as before the accident. He is occupied in light gardening, &c. His pulse rate still remains, however, at from 112 to 120.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A PECULIAR CASE OF SCARLATINA HÆMORRHAGICA.

BY J. DUNCAN HOWE, M.R.C.S. ENG.,
FORMERLY ASSISTANT MEDICAL OFFICER, MONSALL FEVER HOSPITAL, MANCHESTER.

THE following are notes on a case similar to the one reported by Dr. C. De Boinville in THE LANCET of August 9th, 1902, p. 359.

The patient, a boy, aged six years, suffering from necrosis of the right tibia, had been an inmate of the Cheadle

Convalescent Home for six weeks. On Sept. 8th, 1885, an erythematous blush was observed around the wound on the right leg. On the 13th it was elicited that he had been restless during the night and on waking in the morning the trunk and limbs were covered with a red rash. There was no sore-throat, rigor, or vomiting. The temperature was 99° F. On the morning of the 14th the patient was admitted into the Monsall Fever Hospital. The temperature then was 103° and the pulse was 132. The body and limbs were covered with a brilliant red, fine punctate rash and the cheeks were very red, but there was no cervical glandular enlargement. The right tonsil was ulcerated and there was a small yellow patch on it; the left tonsil was enlarged and injected and the fauces and conjunctivæ injected. In the evening the temperature was 99·2° and the pulse was 116. The patient progressed favourably as regarded the scarlet fever. Desquamation began on the 19th and continued normally. Nothing further was observed or reported about the case until Oct. 7th, the twenty-fifth day of the illness, when there was difficulty in micturition. On examination there was found œdema of the skin of the penis and prepuce, but not of the scrotum. It was relieved by acupuncture and there was no further trouble. On the 8th a large square purple patch, two inches by two inches, surrounded by a light-red halo, was observed on the inner side of the calf of the left leg. On the 9th a similar patch appeared on the outer side of the right thigh. It was of about the size of the palm of the hand. At 5.30 P.M. it had extended upwards as far as the groin and downwards to the knee, and encircled the whole thigh and was spreading to the buttock. The parts implicated, which were tense, smooth, and shining, did not pit on pressure but were hard. There was no pain or tenderness. The patch on the right leg had not spread since the previous day. The cuticle over it was raised and the subjacent part looked like a piece of raw liver. There was no œdema of the penis or the scrotum. The rest of the body presented a blanched appearance. Treatment had no effect in stopping the progress of the hæmorrhage. There were no hæmorrhages from the interior of the body. The patient died quietly on the morning of Oct. 10th.

Preston.

TWO CASES OF FOREIGN BODIES SWALLOWED AND THEIR TREATMENT.

BY H. W. BOREHAM, M.B. EDIN.

THE first of these cases was that of a woman who had swallowed three false teeth with their plate, which when *in situ* was attached to the molars on either side of the upper jaw by means of the ordinary wire arrangements. One of these latter had been broken, leaving a sharp point about a quarter of an inch long directed straight outwards from the plate. The woman was in a great state of nervousness and complained of considerable pain in the epigastrium. After the administration of 20 grains of bromide of ammonium she was given bran and coarse porridge with small pieces of thread in large quantities, allowing the minimum amount of fluid. The pain soon left her and in the course of two days she passed without any pain the plate which was found to be encased in the thread and bran, forming a solid mass.

The second case was that of a man who had swallowed a pin. He was treated in the same manner with an equally good result.

In my opinion it is very important that in such cases as little fluid as possible should be allowed during the first two days, and that the bowels should be kept somewhat confined, by the use of opium if necessary, until the foreign body has been passed.

Swindon.

A METHOD OF TREATING TRAUMATIC TETANUS.

BY DR. S. ZLOTOWSKI.

IN 1877, when holding the position of chief of the surgical department of the Imperial Ottoman Military Hospital, Gumush Son, at Constantinople, I had occasion to remove the terminal phalanx of the index finger of a soldier. On the third day after the operation trismus set in and on the fourth day there was opisthotonos with violent spasms. No benefit being derived from treatment on the ordinary lines I had recourse to a method which has not, so far as I know, been mentioned in medical literature. Attached to the hospital there was a Turkish bath which was being used day and night. The patient, in a state of universal rigidity, having been taken there was kept lying on a hot marble slab and every four hours was put into a hot bath for 30 minutes. This treatment succeeded admirably. The spasms ceased, the breathing became more free, and the tetanic symptoms diminished. Before the expiry of the first six days the patient felt comparatively well; the trismus and opisthotonos almost disappeared, he could walk about and even take solid food, and he was very averse to persevere with the treatment which I was intending to continue for at least a day or two longer. Disobeying orders he made his way out of the bath premises to another part of the hospital, but had hardly arrived there when the tetanic symptoms returned with great severity. I therefore had him carried back to the bath and resumed the treatment. The symptoms immediately improved and after 14 more days in the Turkish bath and 24 days' treatment in the wards he was able to return to his regiment quite recovered. The last patient whom I have treated for tetanus was a woman, about 35 years old, who had run a rusty nail into the sole of her foot. As there was no Turkish bath at hand I had a stove put into a room the temperature of which was kept day and night at 35° R. In this room she had a hot bath every three hours, remaining in the bath for 30 minutes. After 14 days' treatment in this heated room she was entirely cured.

This method used by me can be applied in any house or even hut. The temperature of the room is kept between 32° and 35° R. (between 104° and 111° F.) and every three hours the patient has a hot bath of 30 minutes' duration. Morphine injections along the vertebral column are used for the purpose of soothing pain. The result of this treatment, which must be continued for at least 15 days, will always, I think, be satisfactory.

Rustchuck, Bulgaria.

A Mirror OF HOSPITAL PRACTICE, BRITISH AND FOREIGN.

Nulla autem est alia pro certo noscendi via, nisi quamplurimas et morborum et dissectionum historias, tum allorum tum proprias collectas habere, et inter se comparare.—MORGAGNI *De Sed. et Caus. Morb.*, lib. iv., Proœmium.

BIRMINGHAM GENERAL HOSPITAL.

A CASE OF HÆMATURIA OF MANY YEARS' DURATION DUE TO VILLOUS PAPILLOMA OF THE RENAL PELVIS; NEPHRECTOMY.

(Under the care of Mr. GEORGE HEATON and Mr. LEONARD PARKER GAMGEE.)

VILLOUS papillomata of the pelvis of the kidney are extremely rare, but histologically they are indistinguishable from the villous growths of the bladder. They may affect both kidneys,[1] and a case has been recorded by Murchison[2] in which not only were both kidneys affected by these papillomata but a similar growth was found in the bladder at the orifice of each ureter.

A man, aged 48 years, while at work one day nine and a half years ago felt "something go in his left side." On the next day he noticed blood in his urine and for two days afterwards the hæmaturia was very severe. After this there was a complete absence of symptoms for six months; but at the end of that time the hæmaturia returned and the patient was admitted into a hospital near Birmingham. There the left kidney was exposed by the lumbar operation but with a

[1] J. Bland Sutton: Tumours, Innocent and Malignant, second edition, p. 225.

[2] Transactions of the Pathological Society of London, vol. xxi., p. 241.

negative result. For some time after this the attacks of hæmaturia recurred at intervals of about six months, and eight years ago, during an especially severe attack, the man was admitted into the Birmingham General Hospital under the care of Mr. Heaton, and as the bladder was distended up to the umbilicus with blood-clot suprapubic cystotomy was performed; but no source of bleeding could be found in the bladder. There was no hæmaturia for three months after this, but then the attacks began to increase in frequency and the patient was admitted into the same hospital as on the first occasion and his right kidney was explored, but also with a negative result. The hæmaturia continued and four years ago the left kidney was again explored in the same hospital, but with a similar result.

The patient was readmitted into the Birmingham General Hospital two and a half years ago and the bladder was examined with the cystoscope but no source of the bleeding could be found. Since that time he had had almost constant severe pain in the left loin and had passed blood every day. On Jan. 1st, 1902, he was again admitted into the Birmingham General Hospital. He was very anæmic, was passing a large quantity of blood each time he micturated, and on bimanual examination his left kidney was felt to be much enlarged. He also complained of constant aching pain in the region of the left kidney. As previous explorations of the kidney had been without result it was decided that the best course to adopt would be to perform lumbar nephrectomy. Accordingly, on Jan. 10th, this was done by Mr. Gamgee, the operation proving to be difficult owing to the very dense adhesions resulting from the two previous operations. The patient made an uneventful recovery and is at the present time in good health and free from hæmaturia.

The kidney after removal was found to be of about twice the normal size of the organ. The renal pelvis was dilated and completely filled with a diffuse villous growth, which was growing from the whole of the lining wall of the pelvis, there being apparently no part of the wall free from growth which, however, did not extend down the ureter. The kidney substance had completely disappeared, only a fibrous walled sac remaining. The inner lining of the sac wall was over about two-thirds of its area covered with villous growth, which did not fill the sac to the same extent that the pelvis was filled. On microscopic examination the growth was found to be a non-malignant villous papilloma.

Remarks by Mr. GAMGEE.—The existence of a villous papilloma in the pelvis of the kidney gives rise, in the first instance, to symptoms strikingly like those caused by the presence of a similar tumour in the bladder—namely, intermittent profuse hæmaturia with intervals of freedom from symptoms. In this case at the time of operation the enlargement of the kidney had given the first definite information as to the source of the bleeding, and it was felt that nephrectomy, and not simply another exploration, would be the best treatment. Notwithstanding that the growth had been in existence for such a long time, the interior of the ureter was apparently free from growth, though it is a well-known fact that such a growth occurring in the pelvis of the kidney may extend down the ureter into the bladder. The irritation caused by the presence of a calculus may give rise to a villous papilloma in the renal pelvis, but in this instance it does not seem possible to assign any direct cause. The case came under my care owing to the absence through illness of Mr. Heaton, to whom I am indebted for permission to use the notes relating to the past history of the patient and for valuable advice concerning the treatment of the case.

CIVIL HOSPITAL, HALFA, SOUDAN.

A CASE OF LUMBAR HERNIA.

(Under the care of Mr. A. WEBB JONES.)

LUMBAR hernia is a hernia through, or in the neighbourhood of, the triangle of Petit. The size of this triangle varies greatly in different persons. It consists in an interval left between the latissimus dorsi and the external oblique muscles and sometimes these overlap at their attachment to the iliac crest, so that then no triangle of Petit exists. In many cases of lumbar hernia an abscess has weakened the abdominal wall at this spot; in others there is a clear history of local injury. These hernias have a great tendency to strangulation[1] and in the first case of which we have any record the patient died from the strangulation in 1731.[2] Ravaton[3] in 1738 operated successfully on a strangulated lumbar hernia. Mr. Edmund Owen's[4] case was the first in which a radical cure was performed of a hernia of this form and below is recorded a very successful radical cure of a large lumbar hernia.

In a fairly typical case of lumbar hernia the patient was a well-developed male Soudanese, aged about 45 years. He had noticed the swelling for some four or five years and had lately had considerable trouble from local pain and tenderness, with constipation and dyspepsia. The patient could not recall any special blow or strain to which one might attribute the protrusion, but of course any such details from a native of his mental calibre would be of little value. For some days previous to the operation his evening temperature ranged between 99° and 100° F. On examination the right lumbar region presented a large fluctuating tumour, roughly oval in shape but of slightly irregular outline. It extended from the level of the iliac crest inwards and upwards towards the spine and overlapped the lower three or four ribs. The mass gave one the impression that it was to a great extent composed of fat, but on

Lumbar hernia.

reduction—which was easily effected through Petit's triangle—a distinct gurgle was to be felt. The impulse on coughing was very well marked. Over the site of Petit's triangle was a broad scar about two inches long. Mr. Jones was of opinion that this was the result of a mere superficial cut and had no causal relation to the hernia. (It should be mentioned that the habit of making skin cuts with a razor, either for cosmetic or medicinal effect, is very common amongst the

[1] Macready, THE LANCET, Nov. 8th, 1890, p. 963.
[2] Garangeot, Traité des Opérations, p. 369.
[3] Traité des Plaies d'Armes de Feu, 1750.
[4] THE LANCET, May 5th, 1888, p. 883.

Soudanese.) In the left lumbar region there was a slight undue fulness, apparently consisting of fat (perhaps subperitoneal in origin and the forerunner of a hernia), but this gave rise to no symptoms. The patient also presented a left inguinal hernia of moderate dimensions.

An operation with a view to a radical cure was commenced by an oblique incision downwards and forwards over the site of the triangle. After retracting the edges of the external oblique and latissimus dorsi the lumbar fascia was incised. Here a large lobulated mass of adipose tissue presented. The depths of the opening appeared to be divided, so to say, into an upper and lower division by some fibrous bands, above and below which portions of the fatty tissue protruded. Traction on this tissue brought into the wound the ascending colon, which appeared somewhat dilated and thickened. After removing the fat and reducing the colon the edges of the latissimus dorsi and external oblique were united with silkworm-gut and the wound was closed. Primary union was obtained and recovery was uneventful.

Remarks by MR JONES.—Hernia in the region of Petit's triangle, other than those following abscess, are so uncommon that an account of a fresh case may prove of interest. Looking at the somewhat imperfect records of 25 old cases[5] one is able to generalise on the common features of this rare condition. With regard to etiology the sexes are almost equally represented, whilst the majority of the herniæ appear for the first time at middle age. Three of the 25 cases occurred in infants, but one of these followed an old psoas abscess. By far the gravest characteristic, however, of this variety of hernia is its very marked tendency to produce symptoms of local pain, constipation, or even strangulation. Of the 25 cases referred to above no less than four became strangulated, five are said to have been from time to time the cause of vomiting, colic, or constipation, whilst six only are stated definitely to have given no trouble; the rest are without details. One case was bilateral and associated with an inguinal hernia. In two instances the diagnosis was at fault and the bowel was damaged, the surgeon being under the impression that he was incising an abscess.

The question of the existence or non-existence of a sac in these cases is a matter of great interest. In Dr. G. H. Hume's[6] case (operated on for strangulation) a sac is mentioned, but no post-mortem examination was made. In Mr. E. Owen's[7] case (radical cure in a small child who developed a hernia after an old psoas abscess) the point was not investigated. In the case dissected by Mr. J. Hutchinson, jun.,[8] no sac was discovered, but he suggests that the elasticity of the peritoneum together with its loose attachment in this region might allow of some protrusion through the opening with intra-abdominal strain, the peritoneum recoiling with the reduction of the hernia to resume its normal position. I am of opinion that probably such may have been the case to some extent in my own patient. The protrusion of the fatty tissue and colon would doubtless account for a large bulk of the tumour seen on external examination, but I think that a residue would still remain unaccounted for. The fibrous bands crossing the depths of the triangle are also worthy of note. Dr. Hume, in his case of strangulation attributes the constricting agency to similar structures. However, his case did not absolutely correspond to the anatomical site of Petit's triangle, so the parallel may not be insisted on too closely.

[5] Mastin: Annals of Surgery, 1890.
[6] Brit. Med. Jour., 1889, vol. ii., p. 73.
[7] Loc. cit.
[8] Brit. Med. Jour., 1889, vol. ii., p. 71.

VACCINATION FEES.—At the meeting of the Hambledon (Surrey) board of guardians held on Sept. 4th the vaccination committee recommended that fresh contracts should be made for public vaccinators and that the fees should be modified in accordance with the following scale—namely, that a fee of 2*s.* 6*d.* be paid for the revaccination of all persons at boarding-schools, hotels, boarding-houses, and all similar public institutions and places of business. The clerk said that many of the people who were vaccinated at their homes might well go to the surgery to be vaccinated for 2*s.* 6*d.* The recommendation was adopted. The clerk suggested that the scale should be submitted to the public vaccinators for their observations before sending to the Local Government Board. This course was adopted.

Reviews and Notices of Books.

Diseases of the Intestines. By JOHN C. HEMMETER, M.D., Philos. D., Professor in the Medical Department of the University of Maryland; Consultant to the University Hospital and Director of the Clinical Laboratory. In Two Volumes. Volume I. With many Original Illustrations. London: Rebman, Limited. Pp. 742. Price 50*s.* (complete work).

THIS work promises to be one of the most complete monographs on diseases of the intestines yet published. The first volume is concerned with the anatomy and physiology of the intestines, the chief bacteria which infect the tract, methods of diagnosis, therapy and materia medica of intestinal diseases, the symptomatology of these affections, and chapters on intestinal indigestion, enteritis, dysentery, ulcers of the intestine, and intestinal neoplasms. Three chapters of the work have been written by associate professors in the University of Maryland. These deal principally with the more scientific, as apart from the clinical, aspect of the subject.

The section on the Anatomy and Histology of the Intestines is from the pen of J. Holmes Smith, M.D., associate professor of anatomy. The illustrations accompanying this part of the book are excellent and include those of many dissections which greatly help to explain the letterpress. The physiology of the intestines is well described and the chapter on the Utilisation of Food in the Stomach or Intestines of the Healthy Man and under Abnormal Conditions is well worthy of perusal.

Dr. Hemmeter's views on gastric digestion will require further corroboration before they are generally accepted. He believes that the digestive and absorptive capacity of the stomach has been much overrated. He claims that the stomach is nothing more than a reservoir to receive the food and practically to transmit it to the intestine, and that the digestive and absorptive processes which occur in the stomach itself are so insignificant that they may be practically disregarded. However, he does not give full details of his reasons for arriving at the above conclusion, since the present volume is concerned with the intestines and not with the stomach.

The chapter on Intestinal Bacteria is written by W. R. Stokes, M.D., associate professor of pathology and bacteriology in the University of Maryland. The author has performed his task admirably and has produced an interesting account of the principal micro-organisms which are known to be present under varying conditions in the intestine. Dr. Stokes evidently has a thorough knowledge of his subject and is able to express his views in very explicit terms. His account of the bacillus coli communis is very clear and accurate and contains a full summary of all that is at present known with regard to this organism.

Chapter IX. is written by Dr. H. Adler and is entitled, "Diagnostic Significance of Examination of Fæces and Urine." The macroscopic, microscopic, and chemical examinations of the stools are carefully described. Attention is drawn to the importance of examining the fæces in cases of faulty digestion, so that according to the nature of food matters undigested there may follow a proper selection and preparation of the diet. This point is only too frequently neglected and the digestive organs are loaded with materials of which they cannot make proper use, thus increasing rather than diminishing the digestive troubles from which the patient may be suffering.

Turning to the portion of the volume dealing with diet we find much that is interesting. After a discussion on the principles of dietetic treatment Dr. Hemmeter proceeds to give general rules as to the diet which should be employed in certain forms of intestinal affections, such as dyspepsia

(intestinal indigestion) and habitual constipation. The diet tables which are given will be found most useful for reference. They are full and accurate and may be followed with confidence.

The portion of the work dealing with the actual diseases of the intestine is headed, "Intestinal Clinic." Some of the terms will seem strange and perhaps objectional to English readers—such as "obstipation" as a synonym of constipation. The word "coprostasis," too, is not often seen in English text-books. Setting aside these trivial exceptions we have formed a very high opinion of the value of the work from a practical point of view. Diarrhœa, constipation, colic, meteorism, intestinal indigestion, and enteritis are all affections met with every day in the course of practice which give great discomfort to the patient, rendering life most miserable, yet they are conditions to which, speaking generally, sufficient attention is not directed by the teachers at the medical schools, and in most text-books they are dismissed very briefly. Dr. Hemmeter's remarks on the above conditions should therefore prove of considerable value to practitioners. His classification, founded mainly on etiology, is useful in arriving at a diagnosis and subsequently in coming to a conclusion as to the form of treatment most likely to prove successful in any individual case.

The chapter on Dysentery contains a full account of that disease brought fully up to date. The author insists on drinking-water being the most prolific cause of the disease. He discusses at length the various investigations which have been made as to the causal relationship of the amœba coli to dysentery and is apparently in agreement with Kartulis as to its pathogenic value—namely, that the amœba coli is the cause of dysentery, with the exception of the dysenteries occurring in Cochin China. The illustrations of dysenteric ulceration are excellent. With regard to the treatment of dysentery Dr. Hemmeter speaks highly of lavage of the colon, but limits the use of drugs for irrigating purposes to four substances—quinine, tannin, suspensions of bismuth, and solutions of ichthyol. He advises that the strength of the quinine solution should be one part of quinine to 2500 of water, and the strength of the tannin solution 0·5 per cent. The remarks on the use of ipecacuanha are rather surprising. He states that his own experience of this drug in the treatment of dysentery, as observed in the practice of southern colleagues and in 10 cases of acute epidemic dysentery at Bay View Hospital, has led him to discard the drug entirely. Kartulis, on the other hand, is of opinion that ipecacuanha has an almost specific influence upon the dysenteric process, but he admits that in severe cases and in amœbic dysentery it is ineffective. These views are conflicting, but Dr. Hemmeter is supported in his contention by Dr. Osler who states that he has never seen the marked beneficial effect of treatment as described by Anglo-Indian surgeons.

The chapters on Ulcers of the Intestine and Intestinal Neoplasms are also very interesting and the illustrations are beautifully executed. We can congratulate Dr. Hemmeter on having produced one of the best monographs of Diseases of the Intestines yet published.

Clinical Lectures on Surgical Subjects delivered in University College Hospital. By CHRISTOPHER HEATH, Past President of the Royal College of Surgeons of England, Emeritus Professor of Clinical Surgery in University College, London, and Consulting Surgeon to University College Hospital. Second Series. London: J. & A. Churchill. 1902. Pp. 345. Price 6*s.*

CLINICAL lectures have a definite function of their own. They are not intended to replace the systematic teaching which the student should obtain in the ordinary course of lectures on surgery; they are intended rather to supplement those systematic lectures—to fill up the lacunæ which are unavoidably left. When delivered by a great clinical teacher they are of inestimable value in the training of the surgeon yet those who have the opportunity of actually hearing them are but few in number, and it is the next best thing to be able to read them. Every senior student of surgery and many of those engaged in practice will derive great benefit from perusing these very readable clinical lectures. They deal with many subjects, some so common as "ulcers of the leg" and "fracture of the base of the skull"; others are concerned with more recondite matters, such as the use of "the distal ligature in the treatment of aneurysm," but every lecture is clear, interesting, and exact. The volume includes two of the Lane lectures delivered by Mr. Heath in the Cooper Medical College of San Francisco in 1897 and also the Hunterian Oration for 1897. Perhaps the most interesting chapter of the book is one to which we have already referred—namely, the use of the distal ligature in the treatment of aneurysm, for this is a subject with which Mr. Heath's name is closely associated, as he had much to do with the introduction of this method of treatment. It was originally introduced by James Wardrop in 1825 for innominate aneurysm, but Mr. Heath's case in 1865 did much to advance the claims of the operation, although it was subsequently found that the aneurysm was aortic and not innominate. The benefit which resulted in that case naturally suggested the employment of ligature of the carotid and subclavian for aneurysm of the aorta itself, and though the cases hitherto recorded are not very favourable the method certainly deserves consideration. The chapter gives a very good account of the history and the present position of this operation. We have nothing but praise for the whole book and to only one small slip in the volume would we draw attention. In the account of the points of difference between tetanus and strychnine poisoning it is stated that "in the well-known Rugeley poisoning case it was proved that whenever the unfortunate victim took any food which Palmer had prepared for him in half an hour he invariably got a fresh access of spasm." This is incorrect. The food that Palmer prepared always contained antimony and caused vomiting; the strychnine was only given in pills.

Clinical Essays and Lectures. By HOWARD MARSH, F.R.C.S. Eng., Surgeon to, and late Lecturer on Surgery at, St. Bartholomew's Hospital, Consulting Surgeon to the Hospital for Sick Children, President of the Clinical Society of London, and Honorary Member of the Medical Society, State of New York. London: J. & A. Churchill. 1902. Pp. 303. Price 7*s.* 6*d.*

IN this volume Mr. Howard Marsh has collected some papers and clinical lectures that have appeared in various periodical publications, and he has done well in issuing them in this form, for they are of great interest and deserve reprinting. There are 20 papers in all and it is difficult to say which is the most important. Perhaps, on the whole, the chapter on Senile Tuberculosis is the most valuable, because it deals with a condition the very existence of which is ignored by many medical men. Yet, as Mr. Marsh says, "the disease in its various manifestations is frequent rather than rare; its early recognition is often difficult; indeed, it is apt to be overlooked by those who regard it as a mere pathological curiosity." The condition was first described in 1867 by Sir James Paget under the name of "senile scrofula"; yet at the present time in many text-books the subject is not even mentioned. Mr. Marsh describes a number of cases which give a very clear clinical picture. The treatment of senile tuberculosis of a joint is from the first to keep it at absolute rest, but it will unfortunately be seldom of much avail for the prognosis is bad. Another interesting chapter deals with the association of suppuration with malignant disease. The presence

of suppuration in connexion with a swelling is very strong evidence against the presence of a malignant growth, but the author relates many cases in which this unusual complication occurred.

The paper on Displacements and Injuries of Muscles and Tendons is also very important. Tendons are dislocated much more frequently than is usually imagined, and it is necessary that the surgeon should be well acquainted with this condition, for such cases often drift into the hands of bone-setters who by manipulation reduce the displacement. The same chapter deals with rupture of muscles and tendons from muscular contraction, and many interesting cases are related. Another section is devoted to "rare forms of bony ankylosis," and Mr. Marsh shows that ankylosis occurs under many conditions in which it was formerly thought impossible; especially he relates cases which demonstrate that antecedent suppuration is not necessary for the occurrence of ankylosis. In conclusion he points out that passive movements cannot prevent bony ankylosis, rather by maintaining irritation and promoting inflammatory exudation they are likely to hasten its appearance. We have not space to mention in detail all the papers contained in this volume, but we cannot refrain from expressing our approval of the chapter headed the Etiology of Mistakes in Diagnosis. Every surgeon makes mistakes, some of them preventable, others inevitable, but mistakes would be rarer if attention were paid to the points mentioned in this chapter. The whole volume is full of interest and will well repay perusal.

A Treatise on the Acute Infectious Exanthemata. By WILLIAM THOMAS CORLETT, M.D., M.R.C.P. Lond. Illustrated. London: Henry Kimpton. 1902. 392 pages. Price 18*s*

THIS treatise on the acute infectious exanthemata presents the subject with which it deals in a thoroughly practical and efficient manner. The difficulty usually experienced in writing satisfactory accounts of dermatological lesions, and more especially those which are peculiar to the infectious fevers, has been in the present instance surmounted by providing a number of coloured illustrations of the common and typical efflorescences. For the purpose of securing the best possible examples of the *dessinateur's* art in the production and reproduction of coloured illustrations the good offices of M. Félix Meheux, who has rendered himself famous by his illustration of Chatelaine's admirable work on Diseases of the Skin, have been pressed into the service of the present work. The illustrations themselves, with but few exceptions, have been reproduced from photographic negatives taken by the author. 12 of them have been reproduced in colour, while 28 are half-tone plates and two are engravings. The study of these plates will necessarily lighten the task of differential diagnosis which to his confusion often confronts the young practitioner and may to a certain extent fill up a frequent hiatus in his medical equipment. Indeed, as the author admits in the preface, the present volume is the outcome of a similar need for such a work felt by himself "when young in the practice of medicine." The illustrations which constitute so important a feature of Dr. Corlett's treatise present with realistic accuracy the delicate and minute shades of colour which characterise the various phases of the different eruptions. And among those which appeal to us as most satisfactory must be included one of varicella in a child which bears superficial resemblance to the rash of small-pox, while another which illustrates the eruption of measles in its typical distribution is equally satisfactory, and another in a distribution which resembles scarlet fever is highly instructive. Finally, we would mention a very beautifully finished illustration of the typical rash of German measles and enlargement of the posterior cervical lymphatic glands. The coloured plates representing the small-pox eruption in the various stages of efflorescence strike us as less happy examples of artistic skill and accurate delineation. The individual pustules, as is, indeed, often the case with other photographic representations of skin lesions which are raised above the general plane, give a false impression of magnitude. We have, perhaps, dwelt somewhat unduly on the subject of the illustrations, but it is far from our intention to imply that the subject of the text plays a less important part in the general scheme of the work—in fact, had the written portion of the book to rely on its own merits it would assuredly earn considerable success and would merit the attention of all those who are interested in the question of the acute specific fevers. The subject of the exanthemata has been approached from the dermatological, rather than from the clinical, side. Nevertheless, the minute description of the pathological appearance has by no means monopolised the author's attention. Questions concerning the etiology, the prognosis, the diagnosis, and the treatment all receive due consideration. Indeed, in view of the fact that to each of the five specific exanthemata included in the scheme there is a practically uniform allocation of 80 pages it may readily be understood that each fever is very fully described. Practitioners will find particularly useful the minute and accurate dermatological description of the different rashes with the differential points by which they may be distinguished, not only from one another, but also from other erythematous conditions of independent origin, such as are met with in the efflorescences due to drugs, insect bites, and syphilis. Useful also for the same class of readers are the formulary for disinfection especially applicable to the exanthemata and the tables in the addendum which supply the chief features in the differential diagnosis of the various rashes described in the body of the text. The treatment of the specific exanthemata, except as regards prophylaxis and the precautionary measures which are necessitated by their infectious nature, is considered in as few words as possible. In the treatment of scarlet fever we notice that he does not take up the illogical and paradoxical position often noticeable in works on this subject of enjoining a strict milk diet for the purpose of limiting the consumption of albumin. A milk diet has, indeed, its advantages, but not specifically for this reason. In speaking of the advantages of excluding from the sick-room all but the red rays of light in the treatment of small-pox the author says that it is impossible to draw any definite conclusions from the few cases in which he has had personal experience of the method, but from the success already obtained by the chemical or active rays of the colour spectrum in the treatment of lupus vulgaris he is led to believe that much good may be accomplished by this method in the management of variola, and from the favourable reports already given it is assuredly worthy of further trial. Not only as a book of reference, but as one which affords pleasant and interesting reading, we commend Dr. Corlett's treatise to all those who are interested in the subject of the acute specific exanthemata.

LIBRARY TABLE.

Phonographic Outlines of Medical Terms. Third edition. Issued by the Society of Medical Phonographers, and published by Sir I. Pitman and Sons, Limited, London, and G. Pulman and Sons, Limited, London. 1902. Price 2*s*.—The second edition of this useful book was published in 1898. The present edition contains, as did the previous one, outlines and contractions for about 3000 of the more common medical terms, and a list of similar words. 100 new words have been added—e.g., "adrenals," "arteriosus," "bilharzia," "biniodide," "hallux," "haversian,"

"schizomycetes," "symbiotic," but others to be found in the Dictionary have been omitted. The chief alterations are the use of a half length *n* instead of the double length *n* to represent "inter," "intro," "enter," and the use of the upward *l* instead of the downward in the "lymph" series. These innovations, no doubt, are more orthodox, though less facile, than those used in the second edition. A few phrases, such as "every six hours," have been added; also a few general terms such as "medical officer of health," "summer session," and "up to the time of admission." We think others might be added with advantage. "Iodide," "patella," "antistreptococcic," "antiseptic," "aorta," "calcify," "desquamation," "medullary," "sartorius," and some others have been altered and, no doubt, improved. In "analgesia" the hard *g* is now represented by *j*. By the way, "phthisis" is commenced with a *t* in Pitman's Dictionary, owing, we suppose, to the erroneous, although common, pronunciation of phthisis as "tisis." We do not notice "abortifacient" in the list. Many of the outlines are most ingenious and the book should be welcomed by all medical phonographers. —We have also received the *Phonographic Record* for September, which contains a further instalment of "Disinfection of the Hands," by Mr. C. W. Cathcart, F.R.C.S. Eng. & Edin.

The Story of Animal Life. By B. LINDSAY. London: George Newnes, Limited. 1902. Pp. 208. Price 1*s.*—This little book forms one volume of Newnes's Library of Useful Stories. It gives in a plain and simple manner the story of the ascent of animals from the protozoa to man. The last chapter gives an interesting account of "How Zoologists do their Work."

A Pack of Poems. By J. L. LONGSTAFFE. London: George Allen. 1902. Pp. 86. Price 1*s.* net.—All hunting men will welcome Mr. Longstaffe's poems. They are real poems with an indefinable kind of eighteenth-century flavour about them. Nor do they deal with fox-hunting alone, but with other sports such as golf, and with charity—i.e., with the building of an orphanage. Even the non-hunting reader is catered for by such poems as "A Duet on Sonnets" (from which we should say that Mr. Longstaffe, as becomes one who loves the country, knows his Theocritus) and "A Song of Misery."

A Lady Nurse of the Times. By FREDERICK JAMES GANT, F.R.C.S. Eng. London: Elliot Stock. 1902. Pp. 50. Price 1*s.* net.—Mr. Gant must be a veritable Sherlock Holmes in the nursing world. He is always coming across nurses with a past, which past he dissects with merciless minuteness and puts together again in the form of a story. We are glad to say, however, that Mr. Gant informs us in his preface that the heroine of his latest story is dead, so that she will not see her life's tragedy in cold print.

European Fungus Flora Agaricaceæ. By GEORGE MASSEE, F.L.S. London: Duckworth and Co. 1902. Pp. 274. Price 6*s.* net.—This book is a very full catalogue of the agaricaceæ, written in purely technical language. All the agarics of Europe are included and the work will be found very useful to mycologists. Altogether 2750 European species are described, of which 1553 are British.

Aids to Practical Dispensing. By C. J. S. THOMPSON. London: Baillière, Tindall and Cox. 1902. Pp. 92. Price 2*s.* 6*d.*—Practical dispensing, as Mr. Thompson confesses in his preface, cannot be learnt from a book. But a great many useful hints may be so given and Mr. Thompson supplies not a few. The chapter on Pill-making is very good, but so far as regards medical men who supply their own medicines we fancy that few, even if a dispenser is kept, now make their own pills. Mr. Thompson's notes about "incompatibles" and the dispensing of mixtures containing iron, quinine, and the well-known pitfalls of a combination of potassium iodide and spirit of nitrous ether, are accurate and striking. In the next edition of his book we should advise him to correct the all too commonly found error in grammar—namely, the writing "Aquae ad uncias octo" or whatever the quantity may be.

Analytical Records
FROM
THE LANCET LABORATORY.

MILK OF MAGNESIA.

(THE CHARLES H. PHILLIPS CHEMICAL CO., 14, HENRIETTA-STREET, COVENT GARDEN, LONDON, W.C., AND 128, PEARL-STREET, NEW YORK, U.S.A.)

ON analysis this preparation proves to be quite simple in composition. It consists of pure hydrated oxide of magnesium suspended in distilled water without the aid of the vehicles commonly employed in emulsions and without aromatics. It is quite uniform and the hydrate shows no tendency to separate. The preparation neutralises acids as speedily as does a clear solution of the alkalies, so that it serves as an efficient antacid with the advantage that no gas is produced as when a carbonate is used. On mere evaporation the hydrate is obtained in a pure state and on ignition the oxide. The residue contains just a trace of carbonate. The amount of hydrate which we found was 6·13 per cent., which is equivalent to the amount stated to be present—namely, 24 grains in each fluid ounce. The preparation serves as a mouth-wash and possesses obvious advantages as an antacid. Of course, the salt of magnesia formed as the result of neutralising an acid has generally a slight laxative effect.

(1) CHOCOLATE WITH DEVONSHIRE CREAM; AND (2) VANILLA LUNCH CHOCOLATE.

(JOHN CLEAVE AND SON, CREDITON, DEVON.)

1. In this preparation a comparatively large proportion of Devonshire cream has been combined with the chocolate with success and a very palatable and nutritious sweetmeat is the result. 2. The lunch chocolate is an excellent example of the employment of ingredients of high quality. We have evidence before us showing that the choicest materials are used in the preparation of these sweetmeats and that they are prepared with a strict regard to cleanliness. We have remarked before on the very great advances that have been made in the manufacture of confectionery, care now being taken not only to select good and wholesome materials, but to manufacture them also under healthy environments.

THE WINJENNIA REMEDIES.

(THE WINJENNIA PROPRIETARY, LIMITED, MELBOURNE AND SYDNEY; W. H. SMITH, 47, ALDERMANBURY, LONDON, E.C.)

We have received specimens of an ointment and a lotion which contain a powder described as a volcanic deposit to which certain curative effects are ascribed. The powder on analysis proved to contain chiefly the sulphates of iron and alumina, which are soluble in water, while the insoluble portion contained silica associated with alumina and ferric oxide. The ointment and lotion contained the soluble salts described. The lotion is said to be useful in the treatment of sores in cattle. The sulphates of iron and alumina possess, of course, some germicidal power, while they are

astringent. It is conceivable, therefore, that their application in some cases would do good. The "remedies," however, are clearly old-fashioned and crude.

OOWANA SOAP.

(OOWANA, LIMITED, 205, VICTORIA-STREET, LONDON, S.W.)

Our examination of this soap gave satisfactory results. It is free from alkaline excess and irritants and is bland and soothing to the skin. The soap is said to be made from edible fats and a fluid vegetable extract is added to it, an addition which is said to enhance the cleansing properties of the soap while contributing to its favourable action on the skin. The soap is dark olive brown in colour and is agreeably scented.

SCOTCH WHISKY (THE QUEEN'S BRAND).

(BEARDMORE AND CO., LONDON AND GLASGOW; LONDON AGENTS, F. H. AND F. J. GREEN, 2, GRESHAM-BUILDINGS, LONDON, E.C.)

This spirit is described as a "small still Scotch malt whisky." The evidences of analysis and taste are in favour of the statement that it is both old and pure. The results of analysis were as follows: alcohol, by weight 42·29 per cent., by volume 49·81 per cent., equal to proof spirit 87·29 per cent.; extractives, 0·29 per cent.; mineral matter, 0·01 per cent.; and total acidity reckoned as acetic acid, 0·024 per cent. The flavour is mild and characteristic of genuine malt whisky. Much of the whisky of the present day is featureless as regards flavour. This whisky is practically free from acidity and sugary constituents. It is without the bad physiological effects of crude spirit.

DIGESTIVE PEA-FLOUR.

(THE DIGESTIVE FOOD CO., MURRAY-STREET, PAISLEY.)

By a special mode of preparation this specimen of pea-flour has been reduced to an easily digestible state. This is evident from the fact that it contains a larger proportion of soluble constituents than does raw pea-flour. We have obtained the following results on analysis: moisture, 7·89 per cent.; fat, 1·24 per cent.; mineral matter, 2·61 per cent.; proteids, 19·05 per cent.; and carbohydrates, 69·21 per cent. The preparation contains 100 per cent. less moisture than dried peas do, a result probably obtained by cooking. This reduction is important as it raises the proportion of carbohydrates as well as of proteids.

SPECIAL DISINFECTANT SOAP.

(HAROLD HEYDON AND CO., 118, WESTON-STREET, BERMONDSEY, LONDON, S.E.)

As is not always the case with disinfectant soaps, the disinfectant agent used in this instance is of an agreeable character. The smell of the soap suggests oxidised pine oil or oil of turpentine. The soap basis is well prepared since it contains no alkaline excess and is free from foreign ingredients commonly added to soap. The soap produces a free and pleasant lather without waste and has an agreeable effect upon the skin, imparting to it a delicate pine-like smell. Soap itself possesses some antiseptic value and in this instance this value is undoubtedly accentuated.

(1) MOUTH-WASHES; AND (2) TOOTH-POWDERS.

(MESSRS. ROUSE AND CO., 12, WIGMORE-STREET, LONDON, W.)

The composition of the mouth-washes and tooth-powders, two of each of which have been submitted to us, is based on formulæ of well-recognised value. They contain antiseptics and disinfectants adapted particularly for preserving an aseptic condition of the mouth. The formulæ are said to be the outcome of suggestions made by dental authorities. The washes and powders contain no injurious constituent and are pleasant as well as effective.

New Inventions.

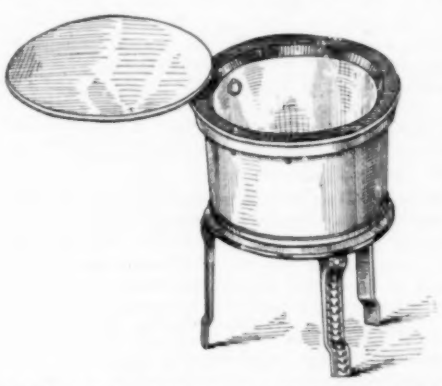
A NEWLY ARRANGED HYPODERMIC SYRINGE AND CASE.

A NEWLY arranged case for hypodermic medication has been submitted to us by Messrs. Burroughs and Wellcome. The syringe itself is entirely made of glass and is (unlike many syringes with glass pistons) accurate and free from leakage. But we should always advise purchasers of such instruments to select their own, as the calibration of such small syringes and pistons is very difficult and often faulty; hence the pistons leak. This case is fitted with a

moveable rack containing 12 tubes of tabloids, two needles, and an exploring needle. The arrangement of the tubes is very ingenious and with a little practice quite simple; the rack swings on its short axis and is so arranged that no tube can fall out. The whole rack, needles, and syringe can be readily boiled after removing the tubes. The outer case is very strongly and carefully made of "gun-metal" with nickel-plated rims.

A PORTABLE COMMODE.

Messrs. Henry Cowley and Co., Limited, have submitted to us one of their portable commodes. It is made of porcelain, provided with a wooden rim and a metal lid which are detachable, and is inclosed in a metal cover. It fits on to a metal tripod stand. For purposes of carriage the stand can be inverted and the commode fits inside the legs. The



whole is then inclosed in a tin box of about the size of an ordinary bonnet box. In this country nowadays the sanitary arrangements of hotels and lodging-houses are usually fairly satisfactory, but this is far from being the case in many places on the continent, and we should say that Messrs. Cowley's invention would be of great use to ladies travelling abroad.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 13, 1902.

The Election of a Direct Representative on the General Medical Council.

FRIDAY, September 5th, was the last day for the receipt of the nomination papers of candidates for the seat on the General Medical Council as a Direct Representative for England and Wales that is now vacant by the expiration of Sir VICTOR HORSLEY'S term of office. We understand that Mr. JOSEPH SMITH of Chiswick, an ex-president of the Association of Incorporated Medical Practitioners, will seek the suffrages of his fellow practitioners, but we cannot say that we think his proposed action an advisable or convenient one. Sir VICTOR HORSLEY has done good and fearless work upon the Council, and thoroughly deserves a further term of office. He has been one of the engineers of the new constitution of the British Medical Association, and it is really important that he should be able to explain to the General Medical Council the views and working of the Association should occasion arise. He enjoys the confidence of a very large section of his constituency and his ability and energy are too conspicuous to be called in question even by those who do not see eye to eye with him upon all matters. We are certain that if the principle of direct representation is to mean anything, and if the voices of the Direct Representatives are to carry weight in the deliberations of the General Medical Council, contested elections should be avoided as much as possible. It seems impossible, while human nature is what it is, that any election for any post can be carried on between rival candidates without a certain amount of asperity being introduced into the relations between them. If Mr. SMITH persists in his ill-advised intention to go to the poll whichever candidate proves to be the successful one will have a weak position. It is almost inconceivable that Mr. SMITH should succeed against a man of Sir VICTOR HORSLEY'S tried ability and record of arduous service, and in the circumstances the profession will be right to resent having the inconvenience of an election thrust upon them.

It has been suggested by Mr. GEORGE BROWN—at least we read his not very comprehensible letter in the *British Medical Journal* of August 30th as conveying this suggestion—that the territorial principle of representation demands the replacing of Sir VICTOR HORSLEY by some one not resident in London. We would suggest to Mr. BROWN that if he feels at all acutely the fact that London has no right to two Direct Representatives—and we are somewhat in sympathy with the view—he himself should resign and should allow a provincial medical man to succeed to a seat upon the Council without an election. An election is not wanted just now. What is wanted is the rousing of the General Medical Council to a sense of the present position of the profession. We can conceive no clearer voice than Sir VICTOR HORSLEY'S for demonstrating the problems of medical politics to the Council, and whoever obstructs his re-election stands in the way of medical progress. As is perfectly well known to all our readers we are frequently in disagreement with Sir VICTOR HORSLEY—a position which that gentleman's temperament probably compels him to view as foolish on our part; but while we make occasional reservations in our approval of his procedure as a medical politician we have no doubt whatever of the excellence of the work that he has done upon the General Medical Council. We trust that all our readers, should this election be forced upon the profession, will register their votes for Sir VICTOR HORSLEY.

Obliterative Arteritis.

THE constriction and closure of large arteries have been described by various observers, but the condition is rare. Professor FRIEDLÄNDER in 1876 described a disease to which he applied the term "obliterative arteritis." The causes of the complaint are unknown but it is often accompanied by neuritis, and, like all anatomical modifications of the lumen of the arteries of the limbs which end gradually in occlusion, it may engender various premonitory symptoms long before it culminates in gangrene. According to Dr. F. W. MOTT (writing in Professor CLIFFORD ALLBUTT'S "System of Medicine," vol. vi., p. 301) the main symptoms are pain in the limbs, intermittent cyanosis, cramps, coldness, and numbness—conditions which, transitory at first, afterwards instal themselves permanently. Sooner or later the pulse is no longer felt in the course of the arteries and the temperature of the part is lowered. Ecchymotic patches appear at one or several points, chiefly at the extremity of the limb. Eschars arise and the gangrene, sometimes moist, sometimes dry, spreads with more or less rapidity. The lower limbs are affected more often than the upper, but the symptoms may begin in the hands; the affection is frequently, but by no means necessarily, symmetrical. Authorities are not altogether agreed upon even the pathological nature of obliterative arteritis and Dr. MOTT states that it is not associated with any particular diathesis or with any acquired disease. But the morbid anatomy of the condition, according to the same authority, consists in thickening of the walls of the arteries due to cellular proliferation of the endarterium and hypertrophy of the middle and external coats; there is also seen a development of vasa vasorum in the middle and external coats, and inflammatory thickening of the small vessels leading to complete occlusion. The obliteration of the lumen of the artery may be due to thrombosis or to proliferating endarteritis.

In another column we publish details of a case presenting exceptional features of interest and reported by Dr. J. A. ARKWRIGHT. The heading as given by the author is—"A Case of Hæmophilia in a Woman with Symptoms of Defective Circulation in the Legs and Threatened Gangrene of the Toe; Death with Cerebral Symptoms." The chief points of

the case are as follows. The patient was a woman, aged about 30 years at the time of her death, who at various periods of her life had manifested the symptoms of hæmophilia, especially on tooth extraction. Seven years before her death she had complained of aching pains in the lower limbs, which persisted for some weeks. About a year before she died marked circulatory changes were noticed in the legs, the left limb being colder than the right and a variable purple mottling was present on the skin of the left below the knee. In the winter the ends of the toes of the left foot became black and purple and gangrene threatened. This condition passed off with rest and elevation but later returned. Subsequently circulatory disturbances were observed in the upper limbs. Both legs then became mottled and pulsation could not be felt in certain of the arteries. Spontaneous hæmorrhage occurred from the gums. Arthritic symptoms resembling those so often associated with hæmophilia also occurred. She died rather suddenly with symptoms of cerebral hæmorrhage. As will be perceived, the symptoms occurring in this case present some similarity to those characteristic of obliterative arteritis. Hæmophilia, as is well known, is far more common in males than in females; indeed, some authorities doubt its existence in women. In the case under consideration, however, the patient certainly seemed to be the subject of a hæmorrhagic diathesis, which is simply a synonym for hæmophilia. The tendency to bleed was shared by a brother in a slight degree, but this tendency could not be traced to a former generation. The swelling and effusion of blood into the joint after a comparatively slight injury were also suggestive of hæmophilia. The pain in the limbs, however, is not characteristic of this disease. Dr. ARKWRIGHT remarks that the coldness and deficient blood-supply to the lower limbs had some resemblance to Raynaud's disease, but rightly adds that the symptoms were too persistent and progressive and did not intermit with sufficient completeness to agree with the classical description of that disease; moreover, the symmetry was very imperfect. Further, exacerbations were generally excited by the use or dependent position of the legs and were not truly paroxysmal. The symptoms observed in obliterative arteritis, especially in the early stages, also resemble those of Raynaud's disease; thus, before the obliteration of the vessels is complete there may be intermittent claudication in the limbs associated with cyanosis and coldness of the extremities.

We are not aware whether the arteries in the brain have been found likewise degenerated in other cases which have been recorded, for if the cerebral arteries do partake in the degenerative process the mode of death would be accounted for—cerebral hæmorrhage due to diseased arteries. The fact that Dr. ARKWRIGHT'S patient was the subject of the hæmorrhagic diathesis would also raise the point as to whether a condition of hypoplasia of the vessels might have existed. The etiology of obliterative arteritis has not yet been fully worked out, but syphilis in some of the recorded cases appears to have been the principal factor. Arterio-sclerosis, with or without syphilis, and strain, have also been ascribed as capable of producing obliteration of the vessels and in some extreme cases of this nature the arteries have been found converted into fibrous cords. As we have already stated, well-marked instances of obliterative arteritis are rare and, in fact, some writers deny that this special form of arteritis exists and maintain that Professor FRIEDLÄNDER and others have mistaken for it a thrombus replaced by connective tissue occurring in an artery affected with arterio-sclerosis. With pathological conditions of only occasional occurrence it is necessary to wait for further cases to be recorded before a definite conclusion can be arrived at. Doubtless some cases of Raynaud's disease have been really instances of obliterative arteritis. We have drawn attention to this condition after reading the case described by Dr. ARKWRIGHT, which presents symptoms suggestive of the possibility of the presence of obliterative arteritis.

The London County Council and Inquests.

THE annual report of the Chief Officer of the Public Control Department of the London County Council for 1901–1902 contains, among other matters, interesting statistics relating to the inquests held by coroners within the Council's sphere of activity and various deductions and recommendations based upon these which may be taken to be before the Council as embodying the views of its Public Control Committee. The London County Council appoints the metropolitan coroners except in certain districts and in some localities where it does not appoint, as well as where it does, it pays their salaries, settles their districts, maintains their courts, and defrays the costs of their inquiries. In the year under consideration notice of uncertified deaths was given to coroners in London, excluding the city, in 9832 cases, and in 7932 of these inquests were held, the cost for the year, including the salaries of coroners, being returned at a little over £32,000. This is a large sum of money, and it is clearly the duty of the London County Council to scrutinise its disbursements and to make sure that all money spent goes to the accomplishment of some useful object; but at the same time £32,000 is not a very large portion of the Council's total annual expenditure. The holding of inquests in proper cases is a matter which closely affects the public health and safety and inconsiderable economy, if it results in the smallest diminution of efficiency, is to be deprecated.

We gather from the report before us that the public control department of the London County Council regards with disapproval an undoubted increase in the number of inquests held in London and in their cost which is to be observed during the past few years and that it suggests as a means to diminish their numbers the institution of preliminary inquiries of a nature not at present provided for by the law. These inquiries, it suggests, should be made by specially appointed "medical investigators" who should inquire as to the causes of uncertified deaths, examine the body in all cases, and hold post-mortem examinations where necessary, reporting the result to the coroner, and afterwards giving evidence and acting as medical advisers to the coroners should the latter officials desire to hold formal inquests.

When, if ever, these proposals are embodied in a Parliamentary Bill it will be time to deal with them in detail and,

for example, to point out that an official who not only appears as a witness but at the same time advises the presiding judge (himself frequently a medical man) upon medical matters is likely to be looked upon as an institution rather novel than desirable. Upon general grounds, however, we would suggest to the County Council, should it be considering the proposals of its public control offices, that the increased number of inquests is not necessarily a cause for dissatisfaction but is probably the result of the increased vigilance of its officers and of a growing feeling in favour of the prevention of avoidable mortality.

The view submitted to the County Council upon this head appears from the following passage in the report: "It appears probable that a proportion of the inquests held was unnecessary, as in no less than 3935 cases—almost precisely one-half of the inquests held—the verdict of the jury was 'Death from natural causes.'" We, on the other hand, hold the opinion that no such inference can be drawn from the figures and fact stated, believing as we do that if thousands of deaths take place in London as to which no medical man will certify it is for the public safety that all should recognise it as almost inevitable that deaths so uncertified will be followed by inquiry. It is true that the creation of a "medical investigator" is suggested to the County Council as a means by which inquiries may be held without formal inquests, but the essential merit of the inquest, which at present has its admitted defects, lies in its publicity and its formality. A "medical investigator" could only be a practitioner instructed to ascertain as far as possible the actual cause of death, to which his inquiry would be limited. Even in this he might be regarded as a person holding an inquisitorial position and one from whom information should be withheld; it would not be right that he should play the part of a detective suggested by the novel and undesirable title of "medical investigator." His inquiry, moreover, would be one of a more or less private nature and might be held without the advantage of the evidence of persons able to impart valuable information. The inquest, on the other hand, is publicly held and publicly reported, so that public opinion is brought to bear upon the matters disclosed and so that those who have anything to say as to relevant facts may at any time learn that it is taking place and come forward to give evidence or may give information afterwards if relevant facts have been suppressed. No inquiry, therefore, by an "investigator," medical or otherwise, can in any way take the place of a coroner's inquest and it does not seem to us that the "medical investigator" could properly do more than can now be done by a medical practitioner employed in the usual way by the coroner to hold a post-mortem examination.

It is, however, submitted to the County Council in the report before us that "the general practitioners who now usually make the post-mortem examinations are rarely qualified by experience for the work, and it may be that a proportion of the post-mortems now made are of little value in determining the cause of death." The writer of the report having made this statement without adducing evidence in support of it goes on to suggest that "a well qualified pathologist experienced in making post-mortem examinations should be employed in each district," and being fond, as will have been seen, of airing speculative theories he adds: "There are probably many capable young pathologists attached to London hospitals who would be glad to undertake work of this nature at an all-round fee of say one guinea per case on the understanding that a considerable number of cases would be referred to them."

Among the further theories put forth in the text of the report as distinct from its statistics we observe the suggestion openly made that coroners multiply inquests because their salaries are based upon a scale proportionate to the number of inquests held, and this is coupled with the recommendation that they should be paid regular salaries independent of the work done as a means to diminish the number of inquiries and the consequent expense to the Council. That coroners should have fixed incomes may be very desirable, but we emphatically protest against the allegation that this should be done on the ground that they now increase their emoluments by corrupt methods. With regard to the report as a whole, it contains interesting figures and statistics and perhaps the germs of useful alterations in the regulations governing the holding of coroners' inquiries. It will, however, we hope, be long before the County Council is permitted to introduce innovations tending to diminish the number or the thoroughness of inquests, which, whatever their defects may be, undoubtedly play a considerable part in the safeguarding of life in the metropolis and indeed throughout the country.

Annotations.

"Ne quid nimis."

DEATH OF SIR FREDERICK ABEL.

THE death of Sir Frederick Abel, G.C.V.O., K.C.B., removes undoubtedly our greatest authority on the chemistry of explosives. At the outset of his career he was quickly associated with research work into the physics and chemistry of gunpowder and other explosive agents. Indeed, the transition from what may be called the gunpowder period in regard to explosives for military purposes to the nitro-explosives period was due to Abel's brilliant researches while Professor of Chemistry at the Royal Military Academy and chemist to the War Department. Sir Frederick Abel cannot be said to be the founder of nitro-explosives but undoubtedly he was the first to recognise the value of applying nitro-explosives as the projecting force for guns. He studied very minutely the conditions under which the nitro-compounds could be adapted for the purpose. Practically the results of his study of this application proved the death-knell of gunpowder in favour of smokeless powder. Abel's name will, perhaps, be best remembered by the public by his connexion with the cordite case. He was accused by Nobel of having acted in bad faith by, as Nobel asserted, having adopted a powder practically of the same composition as the one he had invented (ballastite) for the Government's exclusive use. In other words, Nobel claimed that cordite was a piracy of ballastite. It is almost fresh in our memory that Abel pointed out a very essential difference between the two which made the former safe and effective for ammunition, while the latter was not trustworthy. The circumstances of the case were that Abel was appointed by the Government to determine what powders existed

which could be substituted with advantage for gunpowder and the reply of Abel and his colleague, Professor Dewar, was that at the time of their investigation there existed none. It cannot be gainsaid, however, that through this investigation Abel conceived in what respects nitropowders were unsuitable and his subsequent research upon the subject resulted in an improved powder which fulfilled all the conditions required for an explosive for ordnance use. Thus the charge of bad faith failed. Sir Frederick Abel's work, however, was not confined to the practical study of explosives. He was appointed to inquire into the safe storage of petroleum oil and at the present time regulations exist as to the sale, storage, and use of petroleum oil which owe their origin to the results of Abel's inquiry. Amongst other things he invented a flash-point apparatus for the testing of oil, an apparatus which is officially recognised at the present time. Sir Frederick Abel devoted himself also to the investigation of other branches of science, such as, for example, to the improved manufacture of iron and steel, especially in their relation to the requirements of war material. He was, again, an eager student of pure science and communicated a number of papers chiefly to the Chemical Society and the Royal Society embodying scientific research. Sir Frederick Abel during his career occupied the offices of President of the Chemical Society, of the Institute of Chemistry, of the Society of Chemical Industry, and of the British Association. The death of Sir Frederick Abel will be a melancholy fact to his colleague, Professor Dewar, as having taken place on the eve of his presidency of the British Association this week at Belfast. Sir Frederick Abel proved a faithful servant to the Government and his place as official adviser to the War Department will be hard to fill.

THE MEDICAL LANGUAGE OF ST. LUKE.

THE recently announced death of the Rev. William Kirk Hobart, rector of Killanny, co. Louth, removes from the not too numerous experts in Greek medical literature one of the ablest and most accomplished of the band—the author of the treatise, familiar to theologian and philologist alike, entitled "The Medical Language of St. Luke: a Proof from Internal Evidence that the Gospel according to St. Luke and the Acts of the Apostles were written by the Same Person and that the Writer was a Medical Man." Appropriately dedicated to that eminently Biblical scholar, the present Primate of Ireland, Dr. Hobart's work was published 20 years ago, welcomed by THE LANCET at the time in an extended review, and is now secure in an honoured place in the *apparatus criticus* of the evangelist whose "Gospel" Renan has called the "loveliest book in all literature," and whose "Acts" is pronounced by Professor W. M. Ramsay to be redolent of "genius, skill, and sympathetic historical insight." No doubt, as we indicated in our critical notice,[1] Dr. Hobart is, on occasion the victim of his own enthusiasm, apt to find in St. Luke's phraseology an exclusively medical idiom when there is evidence to show that the word, or words, cited had passed from professional into general currency. Dr. Plummer, Master of University College, Durham, in his very scholarly and able commentary on the Gospel, supplies cogent proof of this, while cordially admitting the value of Dr. Hobart's labours. Another defect of the treatise is the preference given to Kühn's uncritical recension of the Greek medical writers (Leipsic, 1821–30) over the far sounder texts of Hippocrates as constituted by Littré (Paris, 1839–61), and by Ermerins (Utrecht, 1859–65), to say nothing of the still more correct edition now in course of publication by Kühlewein in Teubner's "Bibliotheca Scriptorum Græcorum et Romanorum." Aretaeus, moreover, appears to be known to Dr. Hobart only in the superseded text of Kühn and not in that of the standard edition executed with masterly skill for the Sydenham Society by Dr. Francis Adams of Banchory (London, 1856). These defects, we repeat, detract from the merit of Dr. Hobart's treatise; but when every allowance is made for them that treatise remains a monument of labour almost "Benedictine" in its assiduity and of learning and accumen well worthy of its sacrosanct theme. Its publication by the press of Dublin University, of which its author was a distinguished graduate, does honour to that seat of learning, but for whose liberality it would probably never have seen the light. Dr. Hobart, indeed, conveys as much in his preface, while his comparatively premature death calls for a renewal on our part of the tribute paid 20 years ago to his ample vindication of the third Gospel and of the Acts of the Apostles as incontestably the work of the "Beloved Physician."

[1] THE LANCET, June 9th, 1883, p. 1092

PTOMAINE POISONING.

A SERIOUS epidemic of food-poisoning has occurred in Derby and naturally a good deal of alarm is felt. It is roughly estimated that the number of cases has been 150. Fortunately, the type of disease has not been, in Derby at least, very severe and with one or two exceptions all the persons attacked have recovered or are progressing favourably. At Taunton, however, the death has occurred with symptoms of ptomaine poisoning of a man, aged 75 years. The deceased returned home on the evening of Sept. 8th from Derby, bringing with him a pork pie purchased there. He, his wife, and a servant all ate of it and the following day all three were taken ill, the man dying at night. The source of the poisoning is suspected to lie in certain pork pies purchased from one of the best-known pork butchers in Derby. This theory is also supported by the fact that a visitor to Derby brought back with her to her home in London a pork pie from the same shop. All the persons who partook of the pie suffered with the characteristic symptoms of ptomaine poisoning. Samples of the suspected food have been sent to Dr. Delépine for analysis. As in the case of similar epidemics the symptoms have not occurred as the result of eating meat actually "putrefied"—that is, of meat the smell of which would at once give rise to suspicion. It is known from actual experiment that the most toxic products of putrefaction are present in the earlier and not in the later stages of the process.

GASTRECTOMY.

RECURRENCE after removal of a malignant growth from the stomach may occur either locally in the gastric wall or in the lymphatic glands. Mikulicz has laid much stress on the frequency of local recurrence and points out that a sufficient portion of the stomach is usually not removed. In our present issue appears a paper by Mr. G. A. Syme of Melbourne on a successful case of gastrectomy for malignant disease, in which he advocates removal of nearly the whole of the stomach for gastric carcinoma, for, he maintains, if operation is advisable at all gastrectomy is indicated, since, as the presence of the stomach is not essential for digestion, the more complete its removal the greater the probability of immunity from recurrence, while the increase in the risk is not proportional to the amount removed. Mr. Syme considers it wise for ease in operation to leave a small portion of healthy stomach. There is much to be said for this view, for at present an ordinary pylorectomy for a malignant growth is only too frequently followed by a return of the disease in the stomach, showing that too little of that viscus has been removed. In some points a gastrectomy is an easier operation than a pylorectomy,

for it is less difficult to anastomose the duodenum to the cardiac end of the stomach than to join it to the middle of the organ where the calibre is much greater. Naturally the more of the stomach removed the greater is the shock, but there is no exact proportion between these variants and the shortening of the operation due to the increased facility of performance will of itself diminish the amount of shock. For statistical purposes it is desirable to distinguish between complete gastrectomies and almost complete gastrectomies; in the former no portion of the stomach wall is left behind, the œsophagus being united to the intestine. In almost complete gastrectomies some part of the cardiac end of the stomach is retained, it may be only a few lines in breadth or it may be one or two inches. This distinction is necessary or confusion will arise. Up to the present only about a dozen complete gastrectomies have been performed, but there have been many cases in which more than three-fourths of the stomach have been removed. Mr. Syme's suggestion that we should remove the greater part of the stomach in all operable cases of gastric malignant disease is well worthy of, and will doubtlessly receive, the careful consideration of surgeons in all parts of the world.

THE CONTAMINATION OF ICE-CREAM.

THE making of ice-cream, carried on so frequently by poor Italians in our large towns, no doubt requires supervision. A cheap ice seems to be an irresistible temptation to town children even when there is but little regard for cleanliness in the seller and his surroundings. Two Italians were summoned recently by the sanitary committee of the corporation of Manchester for omitting to take proper precautions for the protection of the ice-cream which they made from infection or contamination and were fined respectively 10*s.* 6*d.* and 21*s.* and costs. Two other Italians were at the same time similarly fined for making ice-cream "in a yard in which there was an inlet or opening to a drain, being an act likely to expose such ice-cream to infection or contamination." Such cases as these are often occurring and will do so as long as the providers of this luxury make it in all sorts of dirty, unfit places, which they will continue to do whilst there is a paying demand for ice-cream. But a movement has been begun by the principal makers to provide a building where it can be made under cleanly and sanitary conditions. It is very desirable that this should be carried out.

THE FORENSIC IMPORTANCE OF DISTINGUISHING BETWEEN THE CONTENTS OF THE SMALL AND LARGE INTESTINE.

THE forensic importance which a minute point in physiology may assume is well illustrated by a case related in the *New York Medical Journal* of July 26th by Professor Austin Flint. A prostitute went to a room in a disreputable hotel about midnight with a man who disappeared in the night and was never discovered. In the morning she was found strangled and mutilated. A man who occupied the opposite room in the hotel and was seen to enter it about 1 A.M. and to leave it about 5 A.M. was charged with the crime. The theory of the prosecution was that he entered the room of the deceased after her companion had left. On his shirt and stockings, on the bed-ticking, floor, and door of his room, on a knife found in his room, and on the floor between his room and the woman's room mammalian blood was found. On matter taken from under the prisoner's long finger-nails bilirubin, tyrosin, cholesterin, triple phosphates, columnar epithelium, eggs of round worms, starch granules, and partially digested muscular tissue and vegetable matters were found. Before Professor Flint was employed in the case the experts thought that these substances came from the large intestine. They understood that a piece of intestine cut out by the murderer was from the large intestine. Though assured of this Professor Flint insisted that the substances came from the small intestine. On referring to the record of the necropsy he found that a portion of the lower part of the small intestine had been cut out and that the large intestine was uninjured. He based his opinion mainly on the presence of tyrosin and bilirubin. In the large intestine the tyrosin would be changed into indol and the bilirubin into stercobilin or hydrobilirubin. This reasoning applies only to normal digestion; in some forms of diarrhœa and in Asiatic cholera tyrosin may be found in the fæces; similarly, in certain pathological conditions bilirubin may be found in the fæces. The forensic importance of the point arose from the defence assuming that fæcal matter (i.e., contents of the large intestine) might be found under the finger-nails of persons of grossly uncleanly habits. Of course no such explanation could apply to substances found only in the small intestine. The prisoner was convicted of murder of the second degree.

BACCELLI'S TRIBUTE TO VIRCHOW.

AMONG the many "Immortelles" laid on Rudolph Virchow's tomb by his European contemporaries, that of Dr. Guido Baccelli, Minister of Agriculture in the Italian Government, may be taken to express the feeling of Italy not only in the medical profession but among nature students throughout the kingdom. We translate it textually as given in the telegram despatched by His Excellency to Professor Posner of the Berlin University: "Wherever, the whole world over, science and freedom, integrity and character are held dear, the highest honour will be paid to the memory of Rudolph Virchow. A light and ornament of our friend Germany he was for more than half a century the master, acclaimed by all masters, in the domain of medical culture. For us Italians he was ever the tender friend, unforgetting and unforgotten. I think I see him still at Berlin on the day of his apotheosis, as he sat in the august assembly on a chair enwreathed in laurel, concealing from himself with the sweet serenity of a great soul the triumph he had earned, so as to leave his heart free to its loving sense of gratitude. I beg you, my dear Posner, to convey to his family, to his colleagues, to his friends our deep fraternal sorrow—sorrow tempered only by the words of Tacitus: "*Non est lugenda mors quam immortalitas consequatur.*"

VENOUS THROMBOSIS IN PNEUMONIA.

THOUGH many cases of venous thrombosis in typhoid fever and influenza have been recorded this complication appears to have been seldom observed in pneumonia. In an important paper, published in the *Johns Hopkins Hospital Bulletin* for June, Dr. Walter R. Steiner states that he could collect only 38 cases of thrombosis in pneumonia. In 27 out of 32 cases the thrombosis occurred during convalescence, in one case on the day of the crisis, and in four cases during the course of the disease. The lower limbs were always affected. As in typhoid fever and other infections the left femoral vein was usually involved. Dr. Steiner relates three cases of thrombosis which occurred in a series of about 500 cases of pneumonia in the Johns Hopkins Hospital. Case 1.—A negro, aged 21 years, was admitted on Jan. 9th, 1899, the fifth day of an attack of double pneumonia. The crisis occurred on the ninth day. Seven days later when resolution was progressing slowly the temperature suddenly rose and there occurred a chill and "prune-juice sputum." No further involvement of the lungs could be detected. The temperature remained

elevated for five days. Four days after its fall thrombosis of the right popliteal vein and œdema of the foot and leg ensued. The temperature rose to 100·8° and there was pain in the leg, especially in the calf. Under a lead and opium lotion the pain was relieved and the swelling was reduced. Case 2.—A man, aged 63 years, a heavy drinker, was admitted on Feb. 1st, 1901, the eleventh day of an attack of pneumonia of the right upper and middle lobes. A systolic murmur was heard at the apex. Three days later the varicose veins of the right leg began to be painful, especially above the knee, where they were red, firm, and tender. Two days later the right internal saphenous vein was visible and cord-like on palpation. He gradually sank and died. At the necropsy thrombosis of the right internal saphenous vein was found. Case 3.—A negro, aged 22 years, a hard drinker, was admitted on Jan. 4th, 1902, the fifth day of an attack of pneumonia of the lower left lobe. Resolution was slow and the temperature reached normal on Jan. 21st. Six days later there was pain in the right leg. In the popliteal space was a tender, cord-like swelling of the size of the little finger. It could be traced down to nearly the lower third of the leg. Recovery followed and he was discharged on March 4th with the popliteal vein no longer palpable.

A DEAR PISTOL.

WE have frequently pointed out that a licence is required for the carrying of a revolver as in the case of other "guns," and have suggested that if it were possible to enforce the law in this respect some small check might be placed on the free handling of firearms by boys and others, although, of course, more effective legal facilities are required if the evil is to be satisfactorily dealt with. At the police-court at Stratford a youth was recently summoned by Mr. Hodges, a vigilant Excise officer, who saw him show a revolver to a friend and at once asked him if he had a licence to carry it. The conscience-stricken youth, who of course had no licence, promptly proceeded to the post-office and bought one, taking what was no doubt a prudent course in order, if possible, to propitiate the bench by complying with the law as far as lay in his power, though in a somewhat belated fashion. This took place on July 25th and as such licences run from August 1st in any given year the defendant's licence only lasted for five days and the Excise for once had the best of it. It was stated in court that he had broken up his revolver—no doubt in disgust at the expense in which it had involved him—and he was only fined the nominal sum of 2*s.* 6*d.* with costs. It must be remembered, when we congratulate Mr. Hodges on his effective action, that it was merely by accident that he saw the revolver exhibited in public and was able to take out the summons, and that any man within his own home and the "curtilage" thereof may keep a pistol without having to pay for a licence and without anybody troubling about it until he shoots himself or somebody else.

FINAL PROGRAMME OF THE SIXTH INTERNATIONAL CONGRESS OF CLIMATOLOGY.

THE final programme of the Sixth International Congress of Hydrology, Climatology, and Geology has now been issued and it offers a very attractive series of excursions at a comparatively moderate cost. On Monday morning, Sept. 29th, the opening ceremony will take place at the town-hall of Grenoble, to be followed by a visit to the monuments of that most picturesque city. In the afternoon the sections will meet at the School of Medicine and there will be a banquet at the town-hall in the evening. In the afternoon of the following day there is to be an excursion to Uriage and on Wednesday afternoon to Allevard. The sections will meet in the morning of those days, but the whole of Thursday is to be devoted to visiting the plateau of Petites Roches, the climatic station in the mountain of the Chartreuse, and the valley of Graisivaudan. Another party will go to Villard-de-Lans and the climatic station of Vercors. The discussions are to be resumed on the Friday morning and continued all day. On Saturday also there will be two sittings, and the business of the Congress will then be concluded; but on Sunday, Oct. 5th, there is to be a great excursion to the Grande Chartreuse and a visit to the convent, and the members will sleep at Aix-le-Bains. On Monday, the 6th, they will visit Aix-les-Bains, the lake of the Bourget, and the Revard climatic station; the members will then part company. The whole of these excursions, including meals, will not cost more than £2, and those members whose names were inscribed before Sept. 10th will obtain a 50 per cent. reduction on the French railway fares to Grenoble. The scientific discussions to be held will be in accordance with the programme published in these columns on July 19th last. The subscription for membership is 20 francs, which should be forwarded to the general secretary, Dr. Fernand Berlioz, à l'Ecole de Médecine, Grenoble, Isère, France.

CHOLERA IN EGYPT.

THROUGHOUT Egypt during the week ending August 25th there were 2010 cases of cholera and 1520 deaths. At Cairo during that period 188 cases of cholera, with 164 deaths, were registered, as compared with 150 cases and 143 deaths during the previous week. The disease has spread to a great extent throughout both Upper and Lower Egypt during the week ended August 25th, notice having been received during this period of 144 new places which have become infected. Owing to this rapid extension of the epidemic the Director-General of the Sanitary Department does not anticipate any marked improvement for some weeks to come. Dr. Ibrahim Eff. Hafiz, late sanitary inspector of Tala District (Menoufieh), contracted cholera during the execution of his duties and died on August 17th.

EDOARDO PORRO—IN MEMORIAM.

"BEFORE the next issue of THE LANCET," writes an Italian correspondent, under date Florence, Sept. 8th, "Salsomaggiore will have paid an impressive tribute to the Senator Edoardo Porro whom the 'Stazione Balnearia' has to thank for much of the organisation and development under which it has become known to the profession. There will be a 'Congresso di Ginecologia,' attended by distinguished obstetricians from both sides of the Atlantic and on the 11th a bust of Porro will be unveiled, the spokesman on the occasion being the Hon. Agostino Berenini, member of the Italian legislature. Among other speakers will be Professor Bertazzoli, lecturer on obstetrics in the Milanese Hospital, in whose hands the 'Sectio Cæsarea Salubrior Instituta' has had a success hardly inferior to that of the master."

PRESERVATIVES IN MILK.

TWO cases where preservatives had been used in milk were brought up at the Leigh (Lancashire) police-court recently. In one of them Dr. Campbell Browne, the county analyst, found eight grains of boric acid to the pint of milk. Dr. J. King, the medical officer of health of Leigh, said that this was absolutely dangerous to an infant, and if it continued to take such milk it would be slowly poisoned; he also stated that a "preservative" even in small quantities retarded digestion. For the defence it was stated that "farmers had to sell their milk, and it went sour in summer much sooner than in winter," two very clear "glimpses of the obvious." It was

urged that the farmers, relying on the statement that such preservatives were harmless bought and used them without having the slightest idea that they were doing wrong. As these were the first cases of the kind brought before them the magistrates took a lenient view and only ordered that the defendants should pay costs. The corporation of Leigh was complimented by the chairman of the magistrates for bringing these cases into court and he said that farmers should not be led away by plausible advertisements. It is to be feared that the standard of education attained by the average working farmer is as yet scarcely sufficient for his guidance in such matters.

THE DISTRIBUTION OF PLAGUE.

A TELEGRAM from the Governor of Mauritius to the Colonial Office states that during the week ending August 28th there were 4 fatal cases of plague in the colony. As regards Egypt, the weekly return issued by the Director-General of the Sanitary Department states that from August 18th to the 24th there were at Alexandria 2 fresh cases and 3 deaths. The cases remaining under treatment were 8 in number, all of them at Alexandria. As regards Hong-Kong a telegram from the Governor (received at the Colonial Office on Sept. 9th) states that for the week ending Sept. 6th there occurred 1 fatal case of plague.

THE PREVENTION OF SPITTING.

WITH reference to the prevention of spitting in public—a subject with which we dealt in an annotation in our last issue—it may be of use to county councillors having the health and cleanliness of their localities at heart if we refer them to previous issues of THE LANCET[1] and call their attention to the action taken by certain Welsh county councils in this matter. Under the Local Government Act of 1888 county councils are given the power to make by-laws for the "good rule and government of their county," and a by-law with reference to spitting has not only been drafted in the counties referred to by one of our Wales and Western Counties correspondents, but has also been submitted to the Home Office for approval and sanction. The proposed by-law was as follows: "A person shall not spit on the floor of any public carriage or of any church, chapel, public hall, waiting-room, schoolroom, theatre, or shop, whether admission thereto be obtained upon payment or not." For the infringement of this by-law a maximum penalty of £5 is provided. The Home Secretary clearly did not think the by-law *ultra vires* so far as the powers given to county councils are concerned, but he declined to approve of it as affecting churches, chapels, schools, and shops. Its application is thus to be limited to public carriages, public waiting-rooms, public halls, and places of public entertainment, while the walls or sides of the places in question, as well as the floors, are not to be spat upon. It will be observed that no attempt has been made to include public highways or public-houses, the by-law dealing only with places where its enforcement is clearly within the bounds of possibility. Even in the limited number of places enumerated above the principle upon which the Home Office sanctions the application of the by-law is not quite clear, but it would seem to be implied that certain places are more under private control than others and should be privately regulated. And in any case a conviction might be followed by an appeal as to whether the by-law was a good by-law under the Act, notwithstanding the sanction of the Home Secretary. As it stands, however, the existence of such a regulation in any locality, even though with a limited application, should tend to call attention to the fact that promiscuous spitting without regard for others is at all times and in all places unnecessary, disgusting, and insanitary.

[1] THE LANCET, March 22nd (p. 851) and June 28th, 1902 (p. 1862).

THE PREVALENCE OF SMALL-POX.

THE following figures show the number of cases admitted to the various hospitals of the Metropolitan Asylums Board for the dates mentioned. On Sunday, Sept. 7th, there was 1 fresh case; on Monday, the 8th, there were 4 fresh cases; on Tuesday, the 9th, there were no fresh cases; and on Wednesday, the 10th, there were no fresh cases.

PULMONARY CONSUMPTION AMONG MINERS ON THE RAND.

THE publication in THE LANCET of June 14th, p. 1677, of a paper on Gold Miners' Phthisis in the Transvaal by Dr. Thomas Oliver of Newcastle-upon-Tyne is receiving the attention of the authorities in South Africa which the important question deserves. It is announced from Johannesburg that a Government commission is to be formed "which will probably be composed of State engineers, doctors, mine managers, miners, and an explosives expert" to inquire into the causes of phthisis among miners. The respirator, it is stated, is being submitted to practical tests and important information is being obtained. It is worthy of note that the appearance in our pages of the article alluded to at once attracted the attention of the *Mining Journal*, one of the most important trade journals in this country and which for a few weeks in succession devoted considerable space to the discussion of the malady. As far back as Nov. 23rd, 1901, there appeared in the *Mining Journal* a letter on "Rock Drill Miners," by Mr. Nicholas Trestrail, C.E., Redruth, who said: "It is surprising to see the number of men returning from foreign mines who in a comparatively short time continuously working rock drills are reduced from strong, healthy individuals, first to mere shadows, and then death." Happily there is now the prospect of something being done for the Transvaal miners. In our issue of Sept. 6th, p. 707, we published a letter, entitled, "Gold Miners' Phthisis," sent by Dr. G. A. Turner, acting assistant medical officer of health for the medical officer of health of the Transvaal, requesting medical men when reporting a case of death from this disease to notify the same to the public health department of the Transvaal and to add, if possible, the name of the mine where the deceased was employed. As it is understood there are still some cases of gold miners' consumption in the mining districts of Northumberland the South African Government might possibly receive some assistance from the north of England.

THE STUDY OF MENTAL FATIGUE IN SCHOOL WORK.

WE have received from Dr. Giuseppe Biller of Bologna a monograph of much interest giving in detail the results of his investigations on "an hour's work done by the children of public schools." The object of the inquiry was to study the amount of mental fatigue in a day's work and in the cycle of the year among boys and girls of an average age of 11½ years. The mental test used was the average correctness of arithmetical sums in division set in examination papers for an hour's work at the beginning and end of the school day, and at the commencement and termination of the scholastic year. The conclusions arrived at were that the quantity of work produced during each successive quarter of an hour affords no rule but becomes more inaccurate; in the afternoon work is both less in quantity and worse than in the morning. At the end of the school year work was always more in quantity but worse in kind. Mental

fatigue in children has often been the subject of investigation and presents problems of interest; if the method employed in ascertaining the facts afforded a certain index of cortical exhaustion results might be obtained of great value in scientific education. Investigators mostly employ examination papers in arithmetic as tests, but the working-out of sums on paper requires work done in the brain and sight impressions with accurate direction of the eyes in looking at the figures, as well as expression of mental processes by the fingers in writing. Some kind of control experiments are desirable to show what amount of inaccuracy in results may be due to the eyes and hand. An error in the written answer may depend upon not looking at the right figure, or writing down the wrong figure, or upon the mental processes in the cortex cerebri where impressions from sight of the figures should interact with impressions retained as to the arithmetical processes previously learned. Inaccuracy appears often to depend upon retinal fatigue or irregular eye-movements not under control. It would be a matter of interest, and might lead to more exact knowledge of the pathology of mental fatigue, if tests were employed in "mental arithmetic" where an auditory impression is followed in the brain by a mental process without necessitating accurate eye fixation so essential in working sums on paper. The difficulty of investigating mental fatigue arises chiefly from the want of a quantitative standard of mental work; the correctness or value of the result is no necessary indication of the amount of nerve energy expended. Superabundant spontaneous thoughts may cause delayed expression and mental confusion which is very exhausting.

BEFORE the revising barrister at Holborn on Sept. 8th Mr. Waterson, on behalf of the President and Council of the Royal College of Surgeons of England, asked that their names should be reinstated in the lists. He said that they had to his knowledge been included in the lists since 1892 and they were entitled under their charter to be there. Henry VIII. granted a charter to the "Masters and Governors of the Mystery and Commonalty of Barbers and Surgeons," and in 1800 George III. granted another Charter to the "College of Surgeons of London." This last retained all the old privileges of the original charter, including the franchise as freemen of the City of London and the suburbs. The Franchise Act of 1832 retained those privileges of voting and the present claim was made under the Act. Mr. Strickland said that he would give his decision after consulting the Acts of Parliament.

OUR readers will be sorry to learn that Dr. Enrico Bottini, professor of operative surgery in the University of Pavia, has been struck down by intracranial hæmorrhage, the right half of the body being completely paralysed. At the last consultation held by his medical colleagues in attendance a slight improvement in the speech was found, while the mind had regained its clearness. Dr. Bottini's contributions to THE LANCET on Angioma Treated by the Galvano-cautery are still remembered and cited, particularly abroad.

WE are informed that Mr. John Croft, F.R.C.S. Eng., has resigned his appointment as one of the two medical officers of the National Provident Institution, a position which he has held for the last 18 years in association with Dr. T. Henry Green. We understand that the directors do not propose to fill the vacancy by the appointment of another surgeon in the place of Mr. Croft but to select a member of the medical branch of the profession.

M. DE SZELL, the Hungarian Premier, who is also Home Minister, has just issued a decree forbidding anyone except doctors of medicine to practise massage.

Looking Back.

FROM

THE LANCET, *SATURDAY, SEPT. 11*, 1824.

FOREIGN DEPARTMENT.

ANALYSIS OF FOREIGN MEDICAL JOURNALS.

ARCHIVES GENERALES.—JULY.

Case of a Tape-worm found in the Bladder, presented to the Royal Academy of Medicine at Paris, by M. JULIA FONTANELLE.

This case appears to us the more extraordinary, since in all our researches we have not been able to find a similar one. It fell under the notice of Dr. DARBON, celebrated for the various experiments which he made at the Hotel Dieu and La Charité for the expulsion of tænia. Before him several physicians had recognised the existence of round worms in the kidnies and the bladder. GERON * has published a case of a woman passing three round worms by the urethra. TULPIUS † makes mention of a worm being passed with the urine, which was round, long, and red as blood. AMBRIOSE PARÉ ‡ says, that LOUIS DURET voided similar ones after a long illness. PANZANI saw a clergyman fifty years of age, who suffered for four years constant pain in that part of the bladder which corresponded to the centre of the sacrum. The different symptoms appeared to announce the presence of stone in the bladder, when there came away with the urine two lumbricales, after which the pain left him. DUCERF,* CHOPPART,† DUMERIL,‡ STROMAIER,§ MOUBLET,‖ and others have published similar observations. There is a curious fact recorded ¶ of a stone being formed in the bladder, having a worm for its nucleus. It is very probable that since the lumbricales are sometimes found in the bladder, the tænia may also exist in it; and the case communicated to the Academy by M. FONTANELLE proves it. In this case several yards of tape-worm were voided by a gentleman fifty-six years of age; his chief symptom was an insupportable pain at the verge of the anus, which left him after the worm was voided.

Statement of Broussais' opinions.

By M. GOUPIL.

This is the seventh article which has appeared in this work, on the same subject. BROUSSAIS is the author of a work entitled *Histoire des Phlegmasies Chroniques* which contains much valuable information; conducts a periodical publication, the *Annales de la Médecine Physiologique;* and is the supposed author of a catechism of physiological medicine, written in a familiar style, being in the form of dialogues between a *savant* and a young physician; and this contains a succinct statement of the new medical doctrine, as it is styled. Opposed to this doctrine are several eminent men, who are, at present, carrying on a severe paper war with BROUSSAIS and his followers. M. BROUSSAIS thinks that he sees gastro-enteritis in every disease, and consequently carries the anti-phlogistic plan to an excess; thus laying himself open to the attacks of his enemies, who really withhold from him the merit which he deserves. We shall take an opportunity of giving, at some future time, an account of the new medical doctrine.

* Journal de Médecine, 1789.
† Observat. Med. lib. 2. cap. 4.
‡ Lib. 20.
¶ Mallatia verminosa della vesica.
† Journal de Médecine, 1803.
‡ Maladies des voies urinaires.
§ Mentioned by JULES CLOQUET, in his work on the anatomy of intestinal worms.
‖ Gregor. Horstius, opp. tom. 2.
¶ Ephemerides de curieux de la nature.

HOSPITAL SATURDAY.—The recent Hospital Saturday collection at Ilfracombe has resulted in nearly £250 being raised for the local medical institution.—In Haslemere, Surrey, Sept. 6th was observed as Hospital Saturday, and by the collections a total of £26 was realised, which, after deducting 13*s.* 6*d.* for expenses, is to be distributed as follows: Haslemere Cottage Hospital, £10 12*s.* 6*d.*; Surrey Convalescent Home, Seaford, £10 10*s.*; and Royal Surrey County Hospital, Guildford, £4 4*s.*

THE ELECTION OF A DIRECT REPRESENTATIVE TO THE GENERAL MEDICAL COUNCIL.

THE following are the election addresses of Sir Victor Horsley and of Mr. Joseph Smith :—

SIR VICTOR HORSLEY'S ADDRESS.

TO THE REGISTERED MEDICAL PRACTITIONERS OF ENGLAND AND WALES.

LADIES AND GENTLEMEN,—On the eve of the expiration of my term of office as one of your representatives on the General Medical Council I beg to offer myself for re-election.

After my first attendance at the Council I instituted a system of reporting to you at intervals the transaction of business in the Council.

I need not, therefore, again recount the work accomplished during the past five years, but I may justly congratulate you on an improvement in the attitude of the Council towards the profession, and in its recognition, if tardy, that reform and amendment of the Medical Acts is a pressing necessity.

My object in standing for re-election as a member of the Council is to further as much as I can the progress of those legislative changes which are not only under present social conditions essential to the welfare of the practitioner, but are, in fact, also necessary to provide adequately for the work of the Council itself and to render its educational decisions properly effective.

I am obliged to you for the confidence you have reposed in me and will endeavour if you re-elect me to fulfil as far as possible what I conceive to be the duties of your representative.

Cavendish-square, W., Sept. 7th. VICTOR HORSLEY.

MR. J. SMITH'S ADDRESS.

TO THE MEDICAL PRACTITIONERS OF ENGLAND AND WALES.

LADIES AND GENTLEMEN,—On several occasions during the past six months I have been asked whether I would allow myself to be nominated as a candidate for the seat on the General Medical Council which shortly becomes vacant. I hesitated to give consent as I fully anticipated that some well-known general practitioner in the north of England would have been nominated in order to assert the principle of "Topographical Representation," of which so much was heard during the election last year when Dr. Woodcock of Manchester was a candidate. In that case I should have stood aside altogether.

Within the last few days several of my colleagues on the Central Council of the Incorporated Medical Practitioners' Association have urged it upon me as a duty to offer myself as a candidate in order to give general practitioners an opportunity of declaring by their votes whether they are desirous that the seats given to the profession by Parliament, in response to the oft-repeated appeals of general practitioners, should, like those granted to the corporations and universities, be handed over to consultants. When the privilege of voting for members of the General Medical Council was first granted to us in 1886 the late Sir Andrew Clark, in a letter published in the medical journals, said that the interests of consultants were already more than adequately represented and that it was natural and proper that general practitioners "should elect as their representatives genuine working members of their own body." If, he added, this principle of election be disregarded, "it would seem, at least to me, that the fight had been fought and the battle won in vain."

Fellow Practitioners, to support and, if possible with your help once for all to establish, the principle so forcibly laid down by the late Sir Andrew Clark, and, I may add, subsequently endorsed by Sir Victor Horsley and other eminent consultants, I have consented to be nominated. Of the 31 members of the Council there were only three general practitioners—viz., Messrs. Brown and Jackson for England and Dr. Bruce for Scotland. How much longer is this one-sided representation to exist?

With regard to my views on medical politics generally I am in *entire agreement* with my friends and colleagues on the Central Council of the Incorporated Medical Practitioners' Association, Messrs. George Brown and George Jackson (your present representatives on the General Medical Council), and if you do me the honour of electing me as your representative it will be my constant endeavour to work in harmony with them. The voting papers will be issued in a few days and I regret very much that the short time which will elapse before you will be called upon to record your votes prevents me from placing my views through the post more fully before each elector. I trust, however, that the cause I represent, that of the general practitioner, will be sufficient to induce every medical practitioner who reads this address to use his utmost endeavours to secure my return at the head of the poll.

I remain, ladies and gentlemen,

Your obedient servant,

JOSEPH SMITH, M.R.C.S. Eng., L.M., L.S.A. Lond., D.P.H. Cantab.,

Late President of the Incorporated Medical Practitioners' Association, President of the Society of Members of the Royal College of Surgeons of England, &c.

Bedford Park, Chiswick, Sept. 4th, 1902.

ASYLUM REPORTS.

Hertfordshire County Asylum (Annual Report for 1901).—The average number of patients resident during the year was 528, comprising 229 males and 299 females. The admissions during the year amounted to 125, of which number 74 were males and 51 females. Of these 124 were first admissions. Dr. A. Norman Boycott, the medical superintendent, states in his report that in only 42 cases among the patients admitted was the insanity the first attack and of less than three months' average duration, and that in 57 cases the average duration of insanity on admission was over 12 months. "These facts, together with the advanced age of many of the patients, show that the type of insanity of the new cases was not very favourable as regards recovery." Among the admissions were 11 patients over 70 years of age. The number of patients discharged as recovered during the year amounted to 17, or 3·2 per cent. of the average number resident. The deaths during the year amounted to 33—viz., 20 males and 13 females, or 6·02 per cent., as calculated on the same basis. The average age of the patients at death was 58·4 years. Of the deaths two were due to senile decay, three each to bronchitis and Bright's disease, four each to colitis and organic brain disease, five each to pulmonary tuberculosis and general paralysis of the insane, and the rest to other causes. No deaths were due to accident or violence and no inquests were held. Post-mortem examinations were made in 31 cases. The general health of the institution has been satisfactory. During August and September there was an outbreak of colitis chiefly affecting old and feeble patients. No other disease of an infectious nature has occurred. Owing to the epidemic of small-pox in London and also to the occurrence of cases in the neighbourhood of the asylum it was considered necessary in November to stop the visiting of patients by their friends. There have been no serious casualties during the year. The Commissioners in Lunacy state in their report that the wards were bright, clean, and cheerful; that the dormitories were fresh and clean; that the patients were neatly dressed and orderly in behaviour; and that the medical case-books were intelligently and well kept. The committee of management states in its report that the main asylum buildings were completed during the year and that the wards were now occupied throughout the institution. An application was made to the Local Government Board for a loan of £2000 for the carrying out of the painting and papering of the asylum. The heating and lighting arrangements have worked well. A scheme for the disposal of the sewage has been prepared and application made to the Local Government Board for a loan of £2450 to carry out the said scheme. The maintenance rate for patients per week was 14*s.* per head.

Obituary.

PROFESSOR RUDOLPH LUDWIG KARL VIRCHOW.

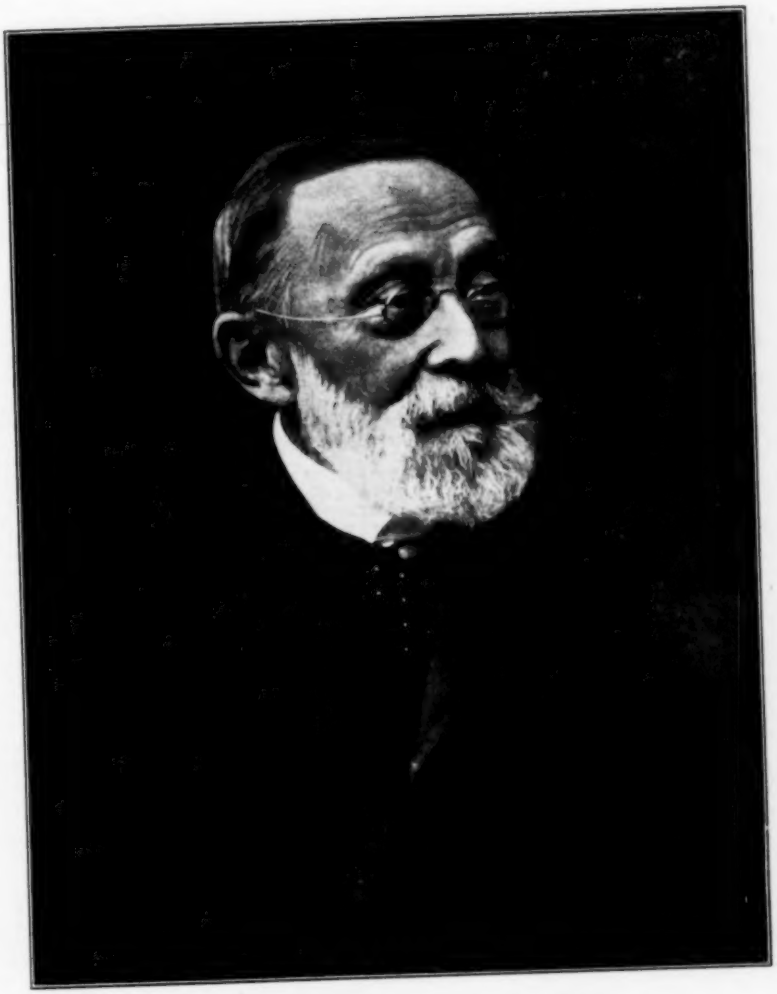
GERMANY, and with her the entire scientific world, mourns the loss of Professor Rudolph Virchow who passed away on Friday last (Sept. 5th, 1902) in the eighty-first year of his age. As a man of science he was world-famous, and justly so, even if his reputation depended on his "Cellular Pathology" alone, for by this epoch-making work, indebted though he was, in part at least, to the researches of previous observers, such as Schwann and his former teacher, Müller, he rescued the science of treatment from the stigma of empiricism and established it firmly upon the basis of a scientific appreciation of ultimate causes. As a democratic politician he represented to his countrymen the very spirit of progress and social reform, and as such his name will remain a cherished memory. So strenuous was his advocacy of his principles and so uncompromising was his language in the opposition to what he considered retrograde measures as to provoke a challenge from Count von Bismarck on the occasion of the defeat of the Government on a navy vote—a challenge which he happily possessed the courage to decline.

Although over 80 years of age Professor Virchow was in the habit of jumping on and off the tram-cars whilst they were in motion and on the occasion of the accident, which occurred to him on Jan. 5th, he slipped on getting down and fell heavily in the road. He lost consciousness for a certain time but on recovering was enabled to give his name and address to a policeman by whom he was removed to his house. Professor Körte of the Urban Hospital was called in and found that Professor Virchow had fractured the neck of his femur. There was a great amount of shock present and for the first few days after the accident a fatal issue was expected, but Professor Virchow's constitution proved to be so excellent that he was soon in a fair way to recovery. Although advised to abstain from all mental work he was not a very tractable patient, and it is reported that he took so much interest in his own case that he declared that no osseous union would take place and that skiagrams which were taken proved the correctness of his opinion. After a time, however, he was able to get about on crutches and early in May he was removed to Teplitz with a view to try the effects of the hot springs which exist there. He improved so rapidly that after a few weeks' stay he was able to go to Hartzburg. A very inclement summer, however, prevented him from taking due advantage of the mountain air. He was nearly always compelled to keep his rooms and by-and-by symptoms of bodily and mental debility supervened. He became more and more apathetic, slept for the greater part of the day, and was unable to leave his chair. About three weeks ago his friends decided to take him home and although the journey from Hartzburg to Berlin takes only four hours it had a very bad effect upon him. He became unconscious and never really recovered from the coma, but expired on the afternoon of Sept. 5th. The news was received with the deepest sorrow by every class of the population of Berlin, and the Municipal Council, to which Professor Virchow had belonged since he went to live in Berlin, held an extraordinary meeting and decided that the funeral should be of a public character.

Rudolph Ludwig Karl Virchow was born on Oct. 13th, 1821, at the small town of Schivelbein, near Stettin, in Farther Pomerania. Of his early years there is but scant record; he appears to have received his education in the gymnasium at Cöslin, where he distinguished himself by his linguistic abilities. In addition to his knowledge of Latin, Greek, English, and French he was a good Hebrew scholar and selected that language as an optional subject for his *Arbiturienten* examination at the age of 18 years. He entered at the Friedrich-Wilhelm Institut, a training college for army surgeons now known as the Kaiser Wilhelm Academie, in 1839, where during the next five years he studied under, amongst others, Müller, Dieffenbach, and Caspar. In 1843 he proceeded to the degree of *Unterarzt* (Berlin University), presenting for his inaugural dissertation a thesis entitled, "De Rheumate Praesertim Corneæ." Although the students of the Friedrich-Wilhelm Institut received their education on the condition of serving in the army, Virchow, during his career there, showed so much skill and intelligence that by order of the General Staff Surgeon he was released from active service and was given the place of assistant at the Charité Hospital. Selecting the scientific rather than the practical side of his profession he obtained the following year the post of prosector of anatomy to the Charité Hospital, acting as assistant to Robert Froriep whom he eventually succeeded in 1846. Early in 1847 he became external lecturer in pathology at the University of Berlin, and shortly afterwards founded the well-known *Archiv für Pathologische Anatomie und Physiologie, und für Klinische Medicin* in collaboration with Benno Reinhardt. From the time of his colleague's death in 1852 onwards he continued to edit the journal alone and enjoyed the satisfaction of celebrating its jubilee, together with that of himself as a teacher, at a banquet held in the Kaiserhof in December, 1897.

In 1848 an incident occurred which would have proved the undoing of a weaker man. Selected to accompany the medical officer entrusted with the investigation of a severe epidemic of relapsing fever (*hunger-typhus*) in Silesia, the actual investigation and the preparation of the report thereon devolved upon Virchow, and these duties were carried out in the masterly style characteristic of the man. In his "Mittheilungen über die in Oberschlesien herrschende Typhus epidemie" he denounced the evils from which the disease resulted, demanded extensive reforms, and concluded by stating that nothing short of the extension of the benefits of civilisation to one and a half million living souls would successfully cope with the epidemic. Such reflections upon the ineptitude of the then administration, coupled with the fact that Virchow on his return had allied himself with the ultra-Radical party and had founded in association with Leubuscher a medico-political journal, *Die Medicinische Reforme* (a paper that ceased to exist when Virchow was appointed to Würzburg), were amply sufficient to ensure his dismissal from all his professional posts in Berlin. His fame as a pathologist had, however, already spread beyond the confines of the capital and the University of Würzburg at once seized the opportunity and offered Virchow the professorship of pathology and the directorship of the newly-founded Pathological Institute. These posts were accepted and for the next seven years Virchow devoted himself almost completely to research work, contributing many valuable memoirs to the pages of his *Archives* and founding a school of workers and thinkers the results of whose observations cannot be too fully appreciated. In 1855 he commenced the publication of his best-known work, "Die Cellularpathologie in ihrer Begrundung auf Physiologische und Pathologische Gewebelehre," propounding therein, as the basis of his theories, the now familiar dictum, "*Omnis cellula e cellulâ.*"

On the death of Professor Hemsbach the Faculty of the University of Berlin petitioned the Minister of Public Instruction to offer a chair of pathology to Virchow, and in spite of strong and bitter political opposition the appeal was successful and Virchow returned to Berlin. He accepted his appointment on the condition that a pathological institute should be founded, and the Government agreed to his wishes. Soon after his return to Berlin the first complete edition of his "Die Cellular Pathologie" appeared in 1858. His great work on new growths, unfortunately never completed, also dates from this period. Under his direction the pathological department, formerly the dissecting-room, of the Charité Hospital became a model for similar institutions. With indefatigable zeal he collected specimens of pathological conditions and arranged and classified them till he had got together a collection only to be equalled by the Hunterian Museum in London. One of his greatest satisfactions was when two years ago, on the occasion of the rebuilding of the Charité Hospital, he was able to open the Pathological Museum where his collection had finally found adequate room and was therefore made accessible to students and to the public. Besides this pathological museum he had made a large anthropological collection of his own, consisting mainly of crania of the different human races. Notwithstanding his manifold occupations he delivered his lectures regularly, and his assistants were only allowed to replace him for the practical work in microscopic anatomy and in making dissections. His lectures were attended not only by students but by medical men from every part of the world. He was not an orator in the usual sense of the word; his voice was weak and his



PROFESSOR RUDOLPH LUDWIG KARL VIRCHOW.

speech was simple and without that power of carrying away an audience which is so common among French speakers, but when he was once upon the platform of the lecture-room everybody felt that the little man with the sharp grey eyes was one to be listened to with the utmost attention. After a few years spent in quiet work Virchow again entered public life as a member of the Berlin Municipal Council, with which body he was connected as an active member for a period of over 40 years. In this capacity his powers of organisation and his conception of the duties of the State with regard to the well-being of the people are evidenced by the establishment of the hospitals of Moabit and Friedrichshain and the lunatic asylums of Dalldorf and Lichtenberg. His greatest work, however, in practical hygiene was concerned with the introduction of drainage and in the erection of sewage-farms, hygienic improvements which he was enabled to carry out despite the opposition and the want of judgment displayed by a great part of the population and even by the authorities. Some doubts were expressed whether the soil of Berlin and its neighbourhood were fitted for a system of sewerage and a sewage farm. Experience, however, has shown that Virchow's genius was right in insisting upon it, as since the establishment of the system Berlin has become one of the healthiest towns on the continent, enteric fever scarcely ever prevailing. Virchow's hygienic work is closely connected with his political career. He was, as we have already stated, early elected a member of the Municipal Council and this position enabled him to carry out in a practical manner what he had found by theoretical and statistical studies to be the best for the health of the town. In 1862 he took his seat in the Prussian Diet and by sheer ability was soon recognised as the leader of the Radical party. This position he resigned, however, in 1878 and in 1880 he became a deputy of the Imperial Reichsrath. As leader of the Opposition he did yeoman service for his country, though his frequent conflicts with the Government prevented any of those decorations which are occasionally bestowed even upon scientific men falling to his lot.

In 1866 his untiring energy found another outlet in the organisation of the ambulance service for the army, both in that campaign and in the succeeding one of 1870–71. Pathology and politics, however, were insufficient to fill the life of this remarkable man. He was President of the German Geographical Society and the Society of Anthropology and Ethnology (of which he was one of the founders), and of many others. Archæology and Egyptology also claimed place in his multitudinous interests, and it may truly be said that in whatever branch of science he worked he became an acknowledged authority. Honours of all kinds were showered upon him. In 1874 he became a member of the Royal Academy of Science of Berlin. On the occasion of the centenary of the Institut de France Virchow was made a Commander of the Legion of Honour and in the following year he became a Foreign Associate of the French Academy of Sciences. In 1893 Virchow visited England and delivered the Croonian Lecture of the Royal Society, a full report of which will be found in THE LANCET of March 18th, 1893, p. 571; it was delivered in English, the subject being "The Position of Pathology among the Biological Sciences." The discourse, which shortly showed the steps by which Virchow had felt himself able to give utterance to his famous dictum, "*Omnis cellula e cellulâ*," was a masterly exposition of the progress of pathology from the time of Harvey. Some six months previously the Royal Society had honoured both itself and Virchow by awarding him the Copley medal, a distinction of which he himself said, "Its significance far exceeds the distinctions which the changing favour of political powers is accustomed to bestow." It was awarded for his investigations in Pathology, Pathological Anatomy, and Prehistoric Archæology.

He visited London again in 1898 and gave the Huxley Lecture at the Charing Cross Medical School on the "Recent Advances in Science and their bearing on Medicine and Surgery," a lecture that impressed his hearers with the fact that advancing years had not blunted either his keen enthusiasm or his comprehensive grasp of detail. The lecture was delivered on Oct. 3rd and on the 5th Virchow was entertained at dinner at the Hôtel Métropole by the members of the medical profession of Great Britain and Ireland. Lord Lister presided, but Sir John Simon, Sir James Paget, and Sir Thomas Grainger Stewart were unavoidably absent. Of these three Sir John Simon alone remains to us, the other two having passed away. It was upon this occasion that Sir Samuel Wilks, the President of the Royal College of Physicians of London, said that he remembered the time somewhere about 40 years before when he was beginning to study the subjects which Professor Virchow had so advantageously taken up. He and his contemporaries were groping their way in the dark when a light came upon them suddenly from afar—a light which illuminated everything and penetrated into the interior and gave them a new insight into physiology and pathology. Virchow came to generalise like another Newton and gave them the Principia of medical science.

With advancing years every occasion was taken of expressing to the *Altmeister* the affection and appreciation of contemporaries and pupils alike. Thus in 1891 his seventieth birthday was celebrated and a gold medal was presented to him by his Emperor in recognition of the immense services which he had rendered to science; in 1893, the fiftieth anniversary of his doctorate, and again in 1897, the jubilees of his first teaching appointment and of the foundation of the *Archives* were made the subjects of sincere and hearty rejoicings; whilst on the occasion of his eightieth birthday—only last year—delegates from practically all the civilised countries of the world assembled in Berlin to do him honour.

In the space at our disposal it is utterly impossible to attempt anything like a list of Virchow's contributions to scientific literature or of the various honours of which he was the recipient. Suffice it to say that his active work ceased only with his death—the world's appreciation of his worth remains.

We hope next week to refer to the influence of Virchow as a pathologist upon that science which he has made his own, but we may say here that by his researches into the nature and causes of death he has let into the secret chambers of life a certain amount of light. It is to the patient work of men like Virchow and Pasteur among the dead, and of Lister, Ehrlich, and Van t'Hof among the living, that we may apply the words of Crookes: "In old Egyptian days a well-known inscription was carved over the portal of the temple of Isis: 'I am whatever hath been, is, or ever will be; and my veil no man hath yet lifted.' Not thus do modern seekers after truth confront nature—the word that stands for the baffling mysteries of the universe. Steadily, unflinchingly, we strive to pierce the inmost heart of nature, from what she is to reconstruct what she has been and to prophesy what she yet shall be. Veil after veil we have lifted and her face grows more beautiful, august, and wonderful with every barrier that is withdrawn."

On Tuesday, Sept. 9th, the body of Virchow was laid to rest in the cemetery of St. Matthew. The first portion of the burial service was said in the Rathhaus where the remains had lain overnight. The hall was draped in mourning and over the platform for the speakers hung a crucifix. The Prussian Ministers of Education and of Finance were present, together with Professor Mommsen, Professor Harnack, and Professor von Bergmann. Professor Waldeyer and others delivered orations and the procession, which was over a mile long, then started on its journey to the cemetery.

DEATHS OF EMINENT FOREIGN MEDICAL MEN.—The deaths of the following eminent foreign medical men are announced:—Dr. Pasternatski, Profess of Internal Medicine in the Military Medical Academy, St. Petersburg.—Dr. von Tappeiner, the Nestor of the profession at Meran, at the age of 86 years. He was an authority on anthropology and botany with special reference of course to the Tyrol.—Dr. Luis Rodriguez Seoane, Professor of Therapeutics in Santiago.—Dr. Paul Ploss, Professor of Medical Chemistry in the University of Budapest at the age of 57 years. He published a Hungarian translation of Hoppe-Seyler's Physiological Chemistry, having been his pupil.—Dr. A. von Remmert, Honorary Body Physician to the Czar and Inspector-General of the Medical Department of the Russian Army.

DEVON AND CORNWALL SANATORIUM FOR CONSUMPTION.—The sanatorium committee of the Devon and Cornwall Branch of the National Association for the Prevention of Consumption and other Forms of Tuberculosis announces that £4967 have been received towards the purchase of the Didworthy estate on Dartmoor, which the committee has acquired and is fitting out as an open-air sanatorium for consumptive patients.

THE ANNUAL REPORT OF THE MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD FOR THE YEAR 1900-1901.[1]

THIRD AND CONCLUDING NOTICE.[2]

IN the second notice of this report mention was made of some curious points which are to be found embedded in the vaccination statistics, and attention was called to the more important special inspections which were undertaken in various parts of the country to determine the sanitary condition of places which had suffered from visitations of preventable disease or in which obvious defects in sanitary administration had been brought to the notice of the Local Government Board.

The possibility that the plague might be readily introduced into many parts of England and Wales and the knowledge previously acquired by the Board that in many ports the sanitary administration was defective and that there was a risk that incoming ships might not always be examined with due care led the Board to cause a general survey to be made of the chief ports and riparian districts.

It is beyond doubt that these surveys have produced the most beneficial results. The visits were made in the years 1897-98-99 and 1900. Dr. Theodore Thomson's report (Appendix A, No. 20) shows that 40 port sanitary districts, 14 urban riparian districts, and three rural riparian districts were examined during these years. During the "cholera survey" which was made in 1893 and 1894 60 ports, 31 urban riparian districts, and six rural riparian districts were examined. A classification has been made of the results of the reports, the places visited being arranged under three headings: (1) good or satisfactory; (2) fair or moderate; and (3) lax, unsatisfactory, or bad. In the case of the examinations made as to the condition of vessels coming into port the ports and riparian authorities have also been classified into three divisions according to their efficiency or their lack of efficiency. It will be seen from the table given below that there has been a distinct general improvement in the condition of the ports between the dates of the "cholera survey" (1893-94) and of "plague survey" (1897-1900).

Table showing in the Case of 50 (identical) Districts Visited in the Course of the Plague and the Cholera Surveys respectively the Manner in which Sanitary Affairs were Conducted by the Local Authorities.

Quality of administration.	Plague survey. Number of places.	Cholera survey. Number of places.
Class I., Good	21	15
Class II., Indifferent	13	14
Class III., Bad	16	21
"Extent and quality of inspection" of vessels coming into port.	—	—
Class I., Good	18	14
Class II., Indifferent	16	14
Class III. Bad	16	22

The most important places in which improvements have taken place are the River Blyth port sanitary district, Dartmouth, Southampton, Workington, and Great Yarmouth. The state of Portsmouth is still unsatisfactory, that of Newhaven is very unsatisfactory, the state of Dover and of Holyhead is bad. The large amount of passenger traffic from the Continent to Dover and Newhaven renders the maladministration of these places a matter of serious concern.

The summary of the history of the progress and diffusion of the plague in 1900 (Appendix A, 18) is a continuation of that which was contained in the annual report for 1899. The two reports together form a valuable digest, but the absence of references to the original sources of information certainly seriously detract from its use as a work of reference—a matter for especial regret in view of the enormous amount of labour which must have been bestowed on its production. In addition to this summary Dr. R. Bruce Low has drawn up a memorandum on cases of plague and "suspected plague" in England and Wales during the year 1900 and on the precautionary measures adopted to prevent the importation and spread of the disease. This report cannot fail to be of use to the future historian of plague, but it would serve no useful purpose to recapitulate in this place the information on a subject which was fully dealt with at the time in the columns of THE LANCET. It may not, however, be out of place to say that the efficiency and energy displayed by the medical officers of the Local Government Board form a very pleasing contrast to the lack of those qualities lately shown in other departments of the State.

The reports on the auxiliary scientific examinations contained in Appendix B are of great interest and some of them are likely to be of practical benefit to the community at large. Appendix B, No 1, is a report on the behaviour of specific microbes in relation with cereal products, by Dr. E. Klein and Dr. A. C. Houston. The report is illustrated by a number of well-produced plates. The results are of a reassuring character. Wheat, flour, oatmeal, and ground rice were the substances with which experiments were made; the bacilli of typhoid fever and of diphtheria and the vibrio of cholera were the microbes of which the behaviour was watched. The result was briefly that in no single instance was there observed any tendency on the part of any of these microbes to multiply in the medium to which they were added.

Appendix B, No. 2, is a report on the bacteriological analysis of various foodstuffs by Dr. Klein. The substances which were subjected to "bacterioscopic" analysis in search of specific microbes were milk, butter, margarine, tinned substances, and other varieties of preserved food. On the whole the results of these experiments will prove comforting to those who eat such things as tinned salmon, tinned potted ham, German sausages, and black puddings. It is rather to be feared, however, that those who have a partiality for delicacies of this description rarely heed the reports of scientific investigations.

The third inquiry in which Dr. Klein was engaged (Appendix B, No. 7) had regard to the infection of mussels and cockles with the typhoid bacillus and with Koch's cholera vibrio. The results of the laboratory experiments on these questions are somewhat disquieting. It appears that Koch's vibrio flourishes and probably increases in the substance of the oyster. The typhoid bacillus is also able to support existence in the bodies of mussels and of cockles. It is true that boiling water kills the microbes as well as the bivalves, but Dr. Klein has collected evidence to the effect that they are sometimes eaten raw, and he denies what he calls the "validity of the cooking" to which they are customarily submitted. He has performed experiments in imitation of the form of cooking to which he takes exception, which it seems consists in pouring water on a heap of the bivalves. The boiling water, he found, was readily cooled by coming in contact with the upper layers of a basin of mussels and those in the lower layers still contained living typhoid bacilli. The very obvious lesson is, that those who eat mussels and cockles should ensure that they are sterilised by heat. It may possibly be worth while to add that there is a general consensus of opinion on the part of those who eat mussels near some of the places from which they come that they are unfit for food at certain seasons of the year and they are, in fact, not then eaten at these places. Whether this opinion is or is not well founded there is, of course, no doubt that all the ill-effects due to the eating of mussels are by no means to be ascribed to typhoid fever. That question, however, is not the one in which Dr. Klein was concerned, and it may be hoped that the results of his work will cause an improvement to be effected in the cooking of mussels. Possibly the Local Government Board will issue a memorandum to peripatetic mussel-merchants insisting on the necessity for the adequacy of the method of cooking to be adopted,[3] otherwise it seems likely that Dr. Klein's investigations will have little practical result. Of the other reports one by Dr. M. H. Gordon on the Bacteriology of Scarlet Fever (Appendix B, No. 3) gives the result of his further researches into this subject.

In reference to this investigation it may be well to recall the fact that the last report issued by the medical officer of

[1] Thirtieth Annual Report of the Local Government Board, 1900-1. Supplement containing the Report of the Medical Officer for 1900-1. London: Eyre and Spottiswoode. 1902. (Cd. 747. Price 6s.)

[2] The first and second notices were published in THE LANCET of August 23rd (p. 548) and Sept. 6th (p. 685), 1902.

[3] Dr. Klein could doubtless draw up a set of regulations to ensure proper cooking.

the Local Government Board contained the account of investigations into the bacteriology of scarlet fever which had previously been made by Dr. Gordon. A summary of the conclusions at which he arrived has already been given in THE LANCET.[4] It may be stated briefly that they supported the view that the streptococcus scarlatinæ is the specialised and essential agent of the specific infection known as scarlet fever. In a footnote to his report Mr. W. H. Power stated with his usual scientific caution that the question as to how far the streptococcus scarlatinæ merited the epithet "specific" was a matter for future investigation to decide and that for the present the term was better avoided. As a result of his further studies Dr. Gordon is led to infer that the more grave manifestations of scarlet fever are due to more than one cause. He believes that "the infectious malady, scarlatina," is due to the agency of streptococcus scarlatinæ and that "the dangerous phases of the disease" frequently result from the invasion of the tissues and of the blood of the patient by the streptococcus pyogenes. These two organisms have been put to the most severe biological tests. "Each of them," says Mr. Power, "derived in turn from a variety of sources has been passed ..... through the bodies of a series of rodents and very generally with the result that when recovered from the tissues of the last rodent of the series the particular streptococcus has been found to have retained its biological individuality altogether unimpaired." Mr. Power believes that as a result of the whole series of Dr. Gordon's investigations there is hope that in future indications for the satisfactory treatment of scarlet fever may be obtained by means of bacterial differentiation. It is to be hoped that this sanguine view may prove correct, but, be this as it may, Dr. Gordon's paper is worthy of study and of consideration.

A series of experiments of still greater practical importance was undertaken with a view to elucidate the etiology of enteric fever and the biology of the soil. Of the problems on which information was sought the first was, What are the precise conditions which in a surface soil otherwise favourable to the multiplication of the typhoid bacillus determine its prompt extinction when placed therein in competition with the bacteria natural to the soil? On this question Dr. Sidney Martin, F.R.S., made a series of experiments (Appendix B, No. 5) in continuation of his previous researches on the question. The chief results which he had hitherto obtained have been published as appendices to the report of the medical officer of the Local Government Board and they may be briefly summarised as follows: (1) In certain virgin soils the typhoid bacillus neither grows nor lives; (2) after cultivation these soils become capable "when sterilised" of maintaining the typhoid bacillus for a limited time; (3) cultivated soils—that is to say, soils containing organic matter—"when sterilised" support the bacillus for a long period and the bacilli spread through the soil; (4) "unsterilised" cultivated soil—or, in plain language, ordinary garden soil—is inimical to the bacilli, the micro-organism cannot be obtained from such soil after 12 days or so. As a result of his further studies Dr. Martin finds that the typhoid bacillus requires nitrogenous food. When proteids are present in the soil they are very slowly exhausted and they enable the bacillus to live for a considerable time. Some of the bacteria which live in the soil, he believes, cause the disappearance of the typhoid bacillus. Dr. Martin is of opinion that it ought not to be inferred that the putrefactive bacteria cause the death of the typhoid bacilli "by destroying the nitrogenous matter and so exhausting the nutrient medium," or, to use more simple language, by starving them out. "Experiments have shown very definitely," he says, "that the products of putrefaction soluble in alcohol are very powerful agents in inhibiting the growth and in destroying the vitality of the typhoid bacillus." The bacillus, he maintains, is destroyed by the products of the putrefactive bacteria which exist in most cultivated soils. The chief and practical point which is taught by these investigations is that the typhoid bacillus has usually only a short life in the soil.

Another question on which Mr. Power thought that inquiry should be made was as to how far the hostility exhibited in the laboratory by surface-soil microbes towards the typhoid bacillus is under the natural condition of the open country extended to other microbes of intestinal derivation, to such microbes, for instance, as are found in far greater number in sewage than is the typhoid bacillus and which under the conditions of open-country experiment are much more readily identified and estimated in bulk than is the enteric fever microbe. The clear way in which Mr. Power propounds definite problems for his scientific staff to solve must have, and, indeed, has already, produced a most salutary effect on the usefulness of the work of the department by directing it in the course most likely to be useful. Dr. Houston, who was entrusted with this investigation, as a result of his elaborate experiments has come to the conclusion that the bacteria of the soil taken as a class readily gain the mastery over the sewage bacteria (Appendix B., No. 4). In regard to the bacillus coli of typical character he found that it survived only a short time in the soil. But this microbe occurs in atypical forms, or as Mr. Power, using a well-known botanical expression, happily names them, "varieties." These varieties of the bacillus coli appeared to become extinct, but on several occasions a distinct increase in their number took place and during this time of increased vitality "typical" forms of the microbe were again present. On one occasion it appears that they were found on the fifty-sixth day and on another as late as the eightieth day after the bacilli were put into the soil.

A third question on which definite knowledge was wanted was: What in a given locality, the soil of which has long been habitually fouled by excremental matter and wherein enteric fever is endemic, is the result, as far as the bacterial quality of the deep soil water, of conflict in the upper layers of the soil between micro-organisms proper to the soil and intestinal bacteria with which such soil has been fouled? An investigation in order to elucidate this question was made by Dr. Houston at Chichester, which is a city in which, as Mr. Power truly observes, "the conditions of soil-fouling could be considered to answer the required purpose." Dr. Houston examined water from 14 wells, the majority of which were situated in those parts of the city which are considered to be endemic typhoid fever areas. 30 samples of well water were tested in regard to their chemical purity, the presence and relative abundance of the bacteria capable of producing gas in gelatin shake-culture, of the bacillus coli, of the bacillus typhosus, of spores of bacillus enteritidis, and of streptococci. The results of chemical examination were not such as to give rise to suspicion of organic pollution; on the contrary, they indicated "somewhat exceptional purity." The number of microbes found was small. "Coli-like" microbes were found in 22 out of the 30 wells. The typhoid bacillus was not detected.

The length of a statement of the "final conclusions" of a scientific paper is usually inversely proportioned to their importance. The results of the surface soil on intestinal bacteria have been briefly stated. The investigations on the water of Chichester, Dr. Houston suggests amongst other final conclusions, may lend some support to the tentative hypothesis that soil plays some part in fostering and localising "enteric fever" in Chichester. Mr. Power, it may be observed, does not adopt that hypothesis, nor does he suggest the view that the eight final conclusions given in the report exactly answer the one somewhat exhaustive question which he propounded. Dr. Houston deserves the greatest credit for the laborious investigation which he has carried out, but it must be admitted that the insanitary condition of Chichester requires further study.

The last of the reports (Appendix B, No. 6) of this series, which is by Dr. J. S. Haldane, is a preliminary note on the use of carbonic oxide in destroying rats on shipboard. This investgation was undertaken in view of the fact that rats on board ships arriving from plague-infected places were not unlikely to become sources of danger in this country. The way in which to exterminate such rats within a short space of time and without injuring the cargo of the vessel was a problem of some difficulty. Carbonic oxide was the gas chosen by Mr. Power for the experiments, and this for two chief reasons. In the first place it was evident that it could be introduced into a vessel before the cargo was "broken" or moved, and therefore before the escape of any rats could be effected. In the second place, as it was already known that the gas stupefies rats without alarming them, it appeared therefore unlikely that any of them would attempt to jump overboard when they were submitted to the fumes. additional advantages offered by the gas were the absence of smell, and the fact that the ship's fittings and cargo would not be damaged by it. The use of carbonic oxide for the disinfection of ships is indeed by no means a new one, for it has long been the practice to kill the rats which

[4] THE LANCET, June 22nd, 1901, p. 1779.

infest the holds of empty ships by lighting a charcoal fire and closing the hatches. The first point which Dr. Haldane had to settle was the method by which the carbonic oxide should be obtained. Having rejected the use of coal gas and water gas because of the danger of explosion, he adopted the use of a gas called "producer" which consists chiefly of nitrogen and carbonic oxide. "Producer" is obtained by blowing air through a deep bed of incandescent coke or anthracite contained in a specially devised furnace.[1] The gas is purified to eliminate the smoke and the sulphuretted hydrogen which are formed in the process of manufacture. This is necessary because the latter gas would injure paint, tarnish metal work, and injure certain cargoes. Experiments with the gas generated on a barge and introduced through the window of a house-boat speedily caused the death of rats contained in cages which had been placed in various parts of the boat. Diagrams of the apparatus used for the manufacture and for the purification of the gas are given in the report, which, as Mr. Power says, clearly shows that the method pursued was wholly satisfactory "so far as an empty vessel of small size is concerned." An investigation is now being made to determine whether it is equally efficient in the case of vessels in which the cargoes are intact.

THE TRANSACTIONS OF THE BRITISH CONGRESS ON TUBERCULOSIS, 1901.[1]

(Concluded from page 700.)

WE come now to the consideration of the proceedings in the

SECTION OF PATHOLOGY.

There is an impression left after reading the proceedings of this Section that much of the study of tuberculosis has left the human body and branched into the paths of biology, morphology, and animal pathology. Including the discussion on tuberculin three days out of four were employed in this direction. Dr. Moeller gave a most succinct and lucid sketch of the bacilli that stain like tubercle and recounted the cultural and disease-producing characters of nine bacilli other than the bacillus tuberculosis. Some of these may come to resemble their precursor even in both respects, but it is reassuring to discover that time and temperature of a culture growth remain a good test of the tubercle bacillus, that the microscope can unravel pseudo-tuberculosis, and that none can vie in malignancy with the bacillus of tubercle. The profound and numerous investigations of Dr. Moeller are those not only of a pathologist but of an experienced clinician. It is of value to learn from him that while the bacillus will continue to hold its high place in diagnosis we must be on our guard in deducing tubercle from but one or two bacilli in the sputa or in the urine, for, in gangrenous lung particularly, the butter bacillus may be found and the smegma bacillus might lead to false suggestion of urogenital tuberculosis.

An English bacteriologist, Dr. W. Bulloch, has closely studied the acid-fast bacilli and his contribution to the discussion travelled fully over the ground of vegetable morphology, recounting the investigations of those who have studied the departure of the bacillus from the true bacillus form into the filamentous form and further into the actinomycotic form, the variation in cultivating media from a serum medium up to acclimatisation of the organism to a luxuriant growth on proteid-free media, and the meaning of the staining properties first shown by Ehrlich. This last is shown to be due to a body of the nature of wax which constitutes 43 per cent. by weight of dried bacilli.

Mr. Harold Swithinbank showed in the museum the results of many years' work in growing these acid-fast bacilli on a medium of constant composition. The approximation of character after many generations naturally tempts the onlooker to think that their identity may be proved. Neither Dr. Moeller nor Dr. Bulloch has seen any evidence of transmutation from one form to another, from saprophyte to parasite. Nor did this great issue receive elucidation. It is to be hoped that Mr. Swithinbank's cultures will go through tests for their infectivity; whatever the result it would pave the way for further investigations.

A paper on the Infectivity of the Milk of Tuberculous Cows, the Bacteriological Diagnosis, and the Practical Value of Tuberculin for the Extirpation of Tuberculosis among Cattle, read by Dr. Lydia Rabinowitsch,[2] must have brought home to her audience the practical issues of acid-fast bacilli. The microscope alone is untrustworthy, Kühnau having found that from 20 to 25 per cent. of the cases examined showed acid-fast bacilli, not tubercle bacilli. Dr. Rabinowitsch tested infectivity by the intra-peritoneal injection of guinea-pigs, in her opinion the only and safest proof of tubercle. Many and tedious experiments were made and the Section was informed of the great difficulties of pronouncing upon the presence of tuberculosis of the udder and of the presence of infectivity when diagnosed, the inference being made that the tuberculin test was the sole quick and sure method. Dr. Ravenel stated that this was done in Philadelphia for "notified milk," at least two tuberculin tests during the year being depended upon to keep the milk good. Professor Bang commented on the fact that tuberculin would not show whether the disease was of the udder or elsewhere. Professor Adami recounted instances where tuberculosis was experimentally produced by the inoculation of centrifugalised milk from cows in which no definite tuberculosis of the udder was present. Professor D. J. Hamilton suggested that evidence of a calf being infected without disease of the udder being present would be much to the point. The facts or arguments brought forward at the Congress must certainly receive due consideration by a medical officer of health before he brings his evidence about milk into a court of law, and he will no doubt desire fair evidence of tuberculous mammitis and will not be content with the presence in the milk of a few acid-fast bacilli only.

It was an admirable arrangement of the Section to devote a day to morbid anatomy and histology—"The Varieties of Tuberculosis"—and still more so to invite Professor Benda to open the discussion.

Professor Benda's paper was replete with facts of pathological anatomy precisely worked out and arranged. He absolutely abstained from any divergence into paths of speculation. Immobility, slow growth, and severe reaction are the fundamental properties of the bacillus. The spread was traced by Koch essentially to the wandering cells but all paths available are made use of. Where masses of tubercle most commonly occur, in the lung and kidney, the epithelial canals play the most important rôle and they may play such part even when infection is conveyed by the blood stream primarily. The mode of spread was fully described; the small bronchi are the most important parts affected, expiration and inspiration are equally agents of spread, but infection does not follow everywhere seeing how many bacilli pass through the larynx before tubercle occurs there. In the kidney the spread is less in the convoluted tubules which are soon blocked, checking progress. The spread is greater in the medullary portion, where affection of the straight and collecting tubes marks the site of mischief; when the gland ducts are deluged spread can occur above and below. If a muscular tube like the ureter is blocked antiperistalsis will occur and this accounts for the unusual occurrence of a spread of disease from the bladder upwards. Professor Benda accounts the lymphatic system a less frequent means of spread. He describes in the intestines the leucocytes carrying bacilli to the lymph ducts and glands, the blocking of ducts, the sure termination of infection, by the gland at least, unless the glands become infected themselves throughout; then bacilli appear beyond them and the thoracic duct and finally the blood stream can be infected. The greatest interest attaches to his description of the blood stream as an agent of spread. In 1894, owing to improved histological methods of studying the structure of the walls of the blood-vessels, their participation in tuberculosis was early shown by Rieder. Professor Benda then saw tubercle of vessels for the first time and since he has been astonished at the amount he can discover. The small vessels if affected are quickly blocked. It was to the larger arteries and veins, by a tuberculous focus upon their wall, that Weigert first traced back with

[1] The exact composition of the gas was found to be: carbonic oxide, 27·61; hydrogen, 4·18; carbonic acid, 3·75; sulphuretted hydrogen, 0·07; nitrogen, 64·39.

[1] Transactions of the British Congress on Tuberculosis for the Prevention of Consumption, London, July 22nd to 26th, 1901. Vols. i. to iv. Edited by the Honorary Secretary-General. London: William Clowes and Sons, Limited. 1902.

[2] THE LANCET, Sept. 28th, 1901, p. 838.

complete explanation the spread of a general infection. Professor Benda shows further that by tuberculous metastasis in the intima an infection of the vessel-wall results. This may be primary or engrafted on an already damaged intima; it may occur upon the thrombi of an atheromatous aorta. An enormous outbreak may arise in tuberculosis of the cardiac valves. Infection is not a necessary sequence of tuberculosis of the intima of large vessels; fibrinous coagulum may effectually seal it. It is to be regretted that no translation of this paper is given, not even is the translated epitome reproduced.

Professor R. Muir pointed out at the end of the discussion that a broad view had been taken and the mode of entrance and the distribution of the bacilli formed the main exposition of the subject. From our knowledge of these points there issued clinical light: the absence of a tuberculous lesion from the intestine does not mean that bacilli have not entered through the mucous membrane, nor does a pulmonary lesion indicate that the lesion was produced by inhalation. Several speakers upon this latter point gave evidence how, in children especially, the bacilli often spread from the glands of the lung into the lung substance and the pulmonary infection was thereby a secondary one.

Professor W. Osler valued highly Professor Benda's observation that in acute miliary tuberculosis an enormous number of bacilli growing directly into tuberculous endarteritis can be a cause of profound toxæmia; so this profound local toxæmia and not the mass of tubercles will adequately account for so-called typhoid forms of acute miliary tuberculosis.

Professor Hamilton gave a reflective review of the seat of election of tubercle bacilli, their rapidity of absorption and degrees of virulence. The most prominent path of distribution was considered to be the lymphatics. The general diffusion of the disease was held to depend upon the rapidity of absorption by the blood-vessels, such absorption being conceived to occur where the abundance of the bacilli overwhelms the phagocytic resistance of the blood. The relative frequency of lymphatic channels as the path of diffusion was explained by the relatively low resistance offered by the lymphatic phagocytes compared to those of the blood stream. The proclivity of lymphatic glands, bone marrow, and spleen for tubercles, it was suggested, might be explained by the mechanism of the circulation in these cases affording a simple winnowing action; at the same time it was pointed out that, while such action in the capillaries of the liver arrested particulate foreign matter, that organ was remarkably free from tubercle. The immunity so frequent in the pericardium when neighbouring serous membranes may be severely affected suggested that the pericardial serum was detrimental to the bacilli. Professor Hamilton supported the general impression that the absorbents can pass on bacilli from the mucous membrane without that structure becoming itself tuberculous.

Dr. S. H. Habershon's large experience of the post-mortem manifestations of phthisis was valuable but his researches were of necessity less fully analysed than the researches of previous speakers. His impressions differed from theirs in finding spread of tubercle by the epithelium rare, and primary invasion by the intestinal mucous membrane common, in phthisis. He observed that when the gangrene occurs in tuberculosis of the lung syphilis is a usual concomitant.

Professor Osler agreed with the previous speaker as to the lesion of tracheal and bronchial glands being a forerunner of general tuberculous pleurisy. Professor Benda had shown that the simple relation of proximity to the thoracic duct accounted for this lesion being often followed by acute general tuberculosis. A paper upon this subject by Dr. P. Haushalter and Dr. A. Fruhinsholz will be seen (p. 339) where they recount its occurrence in 95 per cent. of necropsies of miliary tuberculosis in children. They find the tubercle more developed and deeper-seated here than in any other part, which confirms the explanation of Professor Benda. These writers deem it proof of the importance of aerial contagion in children—a conclusion formulated also by Dr. G. F. Still two years ago upon similar evidence.

Professor E. J. McWeeney referred to the mode of origin of tubercle in the epididymis, the question of the bacillus being sometimes incapable of demonstration from an incapacity to be stained, and the fact that tubercle bacilli can circulate in the blood in considerable numbers without producing miliary tuberculosis—all problems awaiting full solution. The last, Professor Adami explained, depended upon the power of the endothelial cells of the liver to destroy bacteria.

In Professor Benda's reply he said that he had never seen primary tonsillar, and very rarely primary intestinal, tuberculosis. He did not regard phthisis ab hæmoptoë as spreading by absorption of the bacilli from the ulcers that led to hæmorrhage, but looked upon it as simple epithelial spread by inspiratory movement. Upon the question of bacilli penetrating an intact mucous membrane he was guarded, remarking how lesions of the mucous membrane may heal perfectly. Tubercle of the epididymis he considered not primary but a metastasis.

But few papers were read in the Section of Pathology and one only upon human histology—"Excretion Tuberculosis of the Kidney." From Professor Hamilton's address it would be gathered that, in the selection of his material by eliminating specimens with giant cells, Dr. Hugh Walsham has probably selected cases of primary epithelial spread; we cannot therefore say that his descriptions refer to the usual course of spread of disease in the kidney in cases of miliary tuberculosis.

PAPERS ON ETIOLOGY.

The transactions of the Section of Medicine consist largely (one-third or more) of papers upon a variety of subjects. It is easy to say that these are of unequal value but difficult in most cases to say of what value. For many novel measures have received strong advocacy which at the Congress did not obtain full opportunity of receiving criticism; accordingly it seems better to us to criticise rather than to review much of this matter.

There are papers in which the dominant note is the view taken of the importance of some one factor in the etiology of phthisis.

Dr. Denison brings again to our notice under the term "devitalised air toxæmia" the "re-breathed air" of MacCormac; he recounted remarkable evidence, in the few cases acquiring phthisis on the highlands of Colorado of their regular association with very bad ventilation.

Dr. Angiulli and Dr. Bernheim remind us of the history of the hypophosphites. These agents had their use explained by the supposed occurrence of phosphaturia in phthisis. The same reasoning seems to be employed by Dr. Angiulli in his experience of seven cases treated by phosphate of calcium ($CaH_4[PhO_4]_2H_2O$) and by Dr. S. Bernheim who, by injecting three grammes of phosphate of creasote every other day or giving larger doses of phosphoric acid, induced a hyperacid condition of the system, as does, according to him, the sanatorium treatment. Professor Stokvis in 1880 commenced his report upon the elimination of phosphoric acid by the urine in pulmonary phthisis by saying: "L'élimination de l'acide phosphorique par les urines dans la phtisie pulmonaire n'a rien de caractéristique ni au point de vue du diagnostic ni à celui de la pathogenèse." The recent analyses of Goodbody and Bardswell, "On Metabolism in Phthisis," confirm Professor Stokvis, whose conclusion we may also quote: "Dégager la science d'erreurs n'est pas une œuvre stérile et dans la science comme dans le monde il vaut mieux se savoir pauvre que se croire riche."

Alteration of the respiratory exchange is claimed to be a main antecedent condition by Dr. Robin and Dr. Binet who for 26 years have noted increased consumption of oxygen and increased production of carbonic acid in those threatened or affected with phthisis. Of the former, the descendants of consumptives, they find that 13 out of 20 are thus predisposed to infection. This seems too inclusive. Of the latter they find that the traditional treatment by arsenic and cod-liver oil removes the abnormal condition. On the other hand, Professor Cervello, in setting forth the virtues of igazol (formic aldehyde, chloral hydrate, terpine, and iodoform combined—proportions and dose not given) sees in the increased absorption of oxygen and increased excretion of carbonic acid the best evidence of its value, and this seems to be a contradictory comment upon the views of Dr. Robin and Dr. Binet.

Dr. T. N. Kelynack performed useful work in studying the relation of alcoholism to tuberculosis. He discussed three possible views: (1) alcoholism is antagonistic, (2) bears no special relationship, or (3) definitely predisposes, to tuberculosis. Valuable references were given and though unable to find substantial evidence he found much expression of alcoholic influence. Dr. Kelynack might add Part II., Supplement 55th Annual Report of the Registrar-General, p. xci., to his references. The inn servant, with his abominable sleeping accommodation and heavy phthisis

death-rate, strikes us as less to the point than the slight excess above the mean to be seen in the meat-fed butcher.

Dr. Mignon mentioned the danger of the spread of tuberculosis in cases of insufficient nasal permeability, and recommended instruction of the public to breathe solely by the nose.

HEREDITY.

Dr. J. E. Squire informed the Congress that from 8 to 9 per cent. of tuberculous subjects inherit consumption. A second series of observations expressed a similar difference between the offspring of consumptive and of non-consumptive parents developing the disease.

Dr. Maxon King pressed the view of how great an amount of immunity is really inherited, especially when the risk of infection is also considered, and he quoted Dr. Squire's figures as supporting his view. In cases of phthisical parentage Dr. King found the duration of the disease to be four years to three years; in these cases he did not give the ages of the groups. We remember that an investigation 20 years ago found that the consumptive inheritance showed itself at an earlier age, which would not be quite compatible with increased resistance. We are clearly informed that the parents may have been evidently tuberculous before or after the birth of the patient. We believe that while history shows great decline in the death-rate from phthisis during the last half century it shows none in the preceding century and a half, in which case natural selection and inherited immunity must not be called upon by Dr. Maxon King to explain the decline.

Dr. Ernest Mosny mentioned also immunity as well as predisposition. So long is the catalogue of ills in "l'hérédodystrophie paratuberculeuse" that we require to feel the reassurance of actuarial calculation as given by Dr. Squire. We must presume that Dr. Papillon's abstract on "the hereditary arthritic forms of tuberculosis" has been badly translated, as the term "pretubercular" constantly recurs.

REGIONAL TUBERCULOSIS.

Among the most instructive papers is a series dealing with particular regions of the body. We may call attention to a monograph upon Tuberculosis of the Eye by Dr. Allen T. Haight, supplemented by 250 references. In this good work from the other side of the Atlantic we are reminded of similar work from Professor Ravenel, whose broad investigations into bovine and human bacilli supplied the Pathological Section with most timely information running somewhat counter to the surprising declarations of Professor Koch. America is further well represented in Dr. H. Newton Heineman's article upon Tuberculosis of the Heart. This should be read in association with the discussion upon Professor Benda's address.

Tubercle of the larynx has been minutely investigated in its association with pregnancy by Dr. Kuttner. His deductions are thus stated:—

> 1. In women, whose recovery is hopeless, tubercular laryngitis can only be treated by the usual local remedies or by performing tracheotomy. 2. In women whose general health is favourable one may, so long as the affection of the larynx is insignificant (a little redness or slight ulceration), pursue an expectant plan. So soon as symptoms of infiltration show themselves, or the disease extends and becomes diffuse, one should acquaint the patient with the danger of her condition, and, after obtaining her consent, should perform tracheotomy as soon as possible, and if this does not act favourably in a few days, should induce premature labour.

Dr. StClair Thomson described the principles of treatment, expressing clearly the difficulties of early diagnosis, also the limitations and disadvantages of one prevalent form of local treatment—the lactic acid treatment. Among his recommendations are the following:—

> The most rational principle is to attempt to make an early diagnosis of the disease while in an incipient stage. Any persistent or suspicious laryngeal catarrh should be treated seriously on even a presumptive diagnosis. Once diagnosed the patient should be treated on the principles laid down in the modern method of sanatorium treatment. Symptomatic treatment should be directed to any irritative, catarrhal, or obstructive condition of the air passages. In addition, silence should be enjoined, the disuse of the voice being proportionate to the degree in which the focus of infiltration approaches or interferes with the arytenoid joint.

Dr. Clado described a retro-malleolar tuberculosis and a partial tuberculosis of the Fallopian tube.

DIAGNOSIS.

Chief in diagnostic methods stands the application of the Roentgen rays. Dr. Béclère describes his careful refinements of technique, Dr. Hugh Walsham the advantages of the use of the photographic plate, and Dr. Bonnet Leon and Dr. Espina y Capo their wide experience. These observers emphasise the importance of noting diminished movement of the affected side of the chest; this is sooner detected in watching the rise and fall of the diaphragm by the Roentgen rays, it would be inferred, than it is by ordinary observation. Dr. Leon notes that 1 or 2 per cent. of early cases may not be recognised by this method, while 5 per cent. cannot otherwise be detected.

In tuberculous pleurisy Dr. Widal and Dr. Ravant declare that a new membrane prevents endothelial desquamation and diagnosis is afforded by the absence of these cells from the fluid.

The well-known work of Dr. Arloing and Dr. Courmont on serum diagnosis, is set forth in 20 pages of technique and results. They find that 88 per cent. of those clinically phthisical give a positive reaction; Dr. P. Horton-Smith and Mr. H. W. Armit (upon consideration of 29 cases) give the figure as 72 per cent.

Dr. Lydia Rabinowitsch, with Professor Beck, found that agglutination often proved positive when there was no trace of tuberculosis and that incipient tuberculosis often gave a negative result. Even Dr. Arloing and Dr. Courmont found a positive reaction in 26 per cent. of subjects apparently healthy; so although Professor Buard attaches a high value to it we should be afraid to let it influence greatly our clinical judgment.

Mr. J. C. R. Braine-Hartnell sends from his sanatorium a scientific contribution upon rectal temperature. He shows the frequent disagreement of evidence gained from thermometers in the mouth and the rectum respectively. The reason for this he cannot explain, but he is convinced of the importance of rectal temperature as the more trustworthy indicator for treatment.

TREATMENT—DIETETIC.

Dr. Noel Bardswell's *résumé* of his work with Dr. Goodbody and Mr. Chapman has already been referred to. It gave the proof that high feeding can become a prejudicial overfeeding and supplied data of the highest value.

Dr. F. W. Forbes Ross has for a long time worked with meat-juice diet. He finds ready peptonisation and prompt absorption and considers that it throws little stress upon the digestive organs; further, he finds it as beneficial cooked as raw. Our *confrères* from France were kind enough to provide papers with full details of their most recent researches into this diet which has been recently reintroduced there by Richet and Héricourt. Dr. Josias and Dr. J. Ch. Roux give particulars of 16 cases. Dr. Cornil and Dr. Chantemesse report the effect of this diet upon dogs which, it is not surprising to see, become better nourished upon a given weight of raw meat than upon the same cooked. They find that besides the extra nutrition there is evidence of antituberculous qualities in raw meat. Dr. Baradat has been employing meat-juice among his many investigations. He finds, like Dr. Forbes Ross, that it is as valuable cooked as raw. He tells us that from one and a half to three pounds of raw meat daily are required; Dr. Forbes Ross names one pound. Of the value of this diet there is no doubt; it was in use for phthisis in 1874. The results reported do not appear remarkable, but where, as is so often the case, treatment of the digestive organs is necessary, this aid may well be remembered.

GENERAL TREATMENT.

Papers upon treatment are remarkable for novelty; in most cases their authors in commending their treatments are unable to furnish a sufficiently long experience to impress the reader with their values. Novelty is a feature of the high frequency electrical current treatment by Dr. J. A. Rivière and Mr. Chisholm Williams. A triad of papers commend some modification of the old treatment by static electricity, whereby at the same time as the electrical discharge occurs antiseptic substances are by its aid to be transfused. It is evident that besides psychical influence a great stimulating effect follows these modes of treatment, not only local but general. The demonstration of the treatment of lupus by Finsen's method and by the x rays which Dr. J. H. Sequeira and Dr. Dore gave at the Congress showed the high value of those ethereal vibrations; and it is reasonable to expect that real value underlies the high frequency current treatment, but more evidence than is given here is required before we can see what share in recovery this agency has had.

Mr. A. H. Buck described seven cases of external tuberculosis which were much benefited after the administration

of urea, 30 grains three times a day. The analyses of urea excreted seem futile unless a constant diet is given. Dr. Bardswell has told us that the over-fed patient may excrete 900 grains a day.

Formic aldehyde is the drug most often reported upon by contributors of papers. Many are the modes of its administration—transfusion through the skin by electric current (the method of Francisque Crôtte); intravenous injection by Dr. R. Maguire; vaporisation at high temperatures and inhalation by Dr. D. J. A. Chowry-Muthu; and vaporisation at ordinary temperature by Dr. W. R. Huggard. The advantages claimed by the authors of these different methods are as yet unsupported by sufficient evidence to advocate the general use of any of them. A severe test seems to be the disappearance of bacilli from the sputum, and while this was found in 40 per cent. of slight cases undergoing sanatorium treatment only in Britain Dr. Maguire speaks of their disappearance in 18 out of 20 cases (90 per cent.). This he considers due to germicidal action. One part in 40,000 is known to inhibit the lactic acid bacillus in milk, but not to kill it, and when we see that Dr. Maguire states that the strength of the solution of formic aldehyde in the blood is 1 in 50,000 we must doubt its efficacy as a germicide until it has been shown to be more fatal to the tubercle bacillus after the further dilution which it undergoes before reaching it. We think that this disappearance of bacilli in 90 per cent. of cases is not explained. Dr. Huggard's paper includes the results of a wide and well analysed experience in the treatment of phthisis and will be valued by the practitioner.

Mr. Colin Campbell has long worked at washing out the lung by the air tubes with antiseptics. He demonstrated at the Congress his method of injecting glycerine and 3·5 cubic centimetres of izal which will render tubercle bacilli in sputum innocuous when of a strength of 1 in 125 of the mixture.

Dr. F. Barbary reports upon treatment by the subcutaneous injection of cacodylate of guaiacol. Dr. W. Ewart contributes a preliminary note upon the intravenous injection of protargol. Dr. J. Hobbs gave six patients persulphate of soda, one ounce a day, and has commended it for treating anorexia in the tuberculous. Dr Breuillard describes the effect of a combined suction, friction, traction, and pressure on the skin by an apparatus for pneumatic massage. Cases must be judiciously selected. The effects are relief of cough, fuller respirations, and augmented appetite. Dr. Breuillard claims great facility in the employment of his method by any practitioner.

Many speakers and readers of papers endorsed the opinion of Professor Clifford Allbutt that sanatoriums should now carry out clinical investigation; it is hard to see how otherwise an opinion can be formed of the merits of a new treatment where selection of cases will always be the main factor in results. Professor Allbutt considered that this was a duty which the sanatoriums owed to themselves lest they should sink in a slough of routine The National Society for the Prevention of Consumption and other Forms of Tuberculosis, which inaugurated this successful Congress, was suggested as a possible pivot about which the sanatoriums might rotate, mutually communicating knowledge and paths of research. The society would do well to consider whether its influence for good would not be more productive in this direction than in any other.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

IN 76 of the largest English towns 8496 births and 4543 deaths were registered during the week ending Sept. 6th. The annual rate of mortality in these towns, which had been 14·4 and 15·2 per 1000 in the two preceding weeks, further rose to 15·9 per 1000 last week. In London the death-rate was 16·8 per 1000, while it averaged 15·5 in the 75 other large towns. The lowest death-rates in these towns were 5·5 in Hornsey, 5·7 in Reading, 7·5 in Handsworth, 7·6 in Bournemouth, 7·7 in King's Norton, 8·2 in Smethwick, 8·8 in West Hartlepool, and 8·9 in Derby; the highest rates were 19·9 in Plymouth, 20·0 in Salford, 20·4 in Birkenhead, 20·6 in St. Helens, 21·2 in West Ham, 24·4 in Portsmouth, and 24·9 in Burnley. The 4543 deaths in these towns last week included 895 which were referred to the principal infectious diseases, against 641, 638, and 743 in the three preceding weeks; of these 895 deaths 567 resulted from diarrhœa, 84 from whooping-cough, 83 from measles, 57 from scarlet fever, 50 from "fever" (principally enteric), 49 from diphtheria, and five from small-pox. No death from any of these diseases was registered last week in Burton-on-Trent, Handsworth, Smethwick, Warrington, Bury, or York; while they caused the highest death-rates in Croydon, West Ham, Portsmouth, Plymouth, Bootle, St. Helens, and Wigan. The greatest proportional mortality from measles occurred in Bristol, Walsall, Newcastle-on-Tyne, and Cardiff; from scarlet fever in Wallsall and Tynemouth; from diphtheria in Hanley and Burnley; from whooping-cough in Portsmouth, Barrow-in-Furness, and Hull; from "fever" in West Ham; and from diarrhœa in Croydon, West Ham, Portsmouth, Plymouth, Bootle, St. Helens, Wigan, and Preston. Two fatal cases of small-pox were registered in London, and one each in Croydon, Bolton, and Swansea, but not one in any other of the 76 large towns. The number of small-pox cases under treatment in the Metropolitan Asylums hospitals, which had been 170, 128, and 109 at the end of the three preceding weeks further decreased to 95 at the end of last week; 12 new cases were admitted during the week, against 24, 18, and 11 in the three preceding weeks. The number of scarlet fever cases in these hospitals and in the London Fever Hospital, which had been 2595, 2623, and 2651 on the three preceding Saturdays, had further risen to 2713 on Saturday, Sept. 6th; 333 new cases were admitted during the week, against 303, 296, and 295 in the three preceding weeks. The deaths referred to diseases of the respiratory organs in London, which had been 159, 136, and 139 in the three preceding weeks, decreased again to 123 last week and were 16 below the corrected average number. The causes of 55, or 1·2 per cent., of the deaths in the 76 towns were not certified either by a registered medical practitioner or by a coroner. All the causes of death were duly certified in Bristol, Leicester, Nottingham, Manchester, Salford, Leeds, and in 45 other smaller towns; the largest proportions of uncertified deaths were registered in Northampton, Ipswich, Liverpool, Bootle, and Middlesbrough.

HEALTH OF SCOTCH TOWNS.

The annual rate of mortality in the eight Scotch towns, which had been 15·7, 14·4, and 14·0 per 1000 in the three preceding weeks, further declined to 13·9 per 1000 during the week ending Sept. 6th, and was 2·0 per 1000 below the mean rate during the same period in the 76 large English towns. The rates in the eight Scotch towns ranged from 5·3 in Leith and 10·6 in Dundee and in Greenock, to 13·5 in Aberdeen and in Paisley, and 16·5 in Glasgow. The 448 deaths in these towns included 31 which resulted from diarrhœa, eight from whooping-cough, six from measles, six from "fever," two from diphtheria, and one from scarlet fever. In all, 54 deaths were referred to these principal infectious diseases last week, against 64, 52, and 45 in the three preceding weeks. These 54 deaths were equal to an annual rate of 1·7 per 1000, which was 1·4 per 1000 below the mean rate last week from the same diseases in the 76 large English towns. The fatal cases of diarrhœa, which had been 23, 22, and 14 in the three preceding weeks, rose again last week to 31, of which 20 occurred in Glasgow, five in Dundee, and four in Edinburgh. The deaths from whooping-cough, which had been 14 and 17 in the two preceding weeks, declined again to eight last week, and included four in Glasgow, two in Aberdeen, and two in Perth. The fatal cases of measles, which had been nine, five, and four in the three preceding weeks, rose again last week to six, of which two were registered in Glasgow, two in Edinburgh, and two in Paisley. The deaths from "fever," which had been two and four in the two preceding weeks, further increased to six last week, and included four in Glasgow and two in Edinburgh. The deaths referred to diseases of the respiratory organs in these towns, which had been 73, 68, and 54 in the three preceding weeks, rose again last week to 61, and were slightly in excess of the number recorded in the corresponding period of last year. The causes of 14, or more than 3 per cent., of the deaths registered in these eight towns were not certified.

HEALTH OF DUBLIN.

The death-rate in Dublin, which had been 19·5 and 20·6 per 1000 in the two preceding weeks, further rose to

ANALYSIS OF SICKNESS AND MORTALITY STATISTICS IN LONDON DURING AUGUST, 1902.

(Specially compiled for THE LANCET.)

CITIES AND BOROUGHS.	Estimated population in the middle of 1902	NOTIFIED CASES OF INFECTIOUS DISEASE.											DEATHS FROM PRINCIPAL INFECTIOUS DISEASES.										Deaths from all causes.	Death-rate per 1000 living.	Deaths of infants under one year to 1000 births.
		Small pox.	Scarlet fever.	Diphtheria.*	Typhus fever.	Enteric fever.	Other continued fevers.	Puerperal fever	Erysipelas.	Cholera.	Total.	Annual rate per 1000 persons living.	Small pox.	Measles.	Scarlet fever.	Diphtheria.*	Whooping-cough.	Typhus fever.	Enteric fever.	Other continued fevers.	Diarrhœa.	Total.	Annual rate per 1000 persons living.			
LONDON	4,579,107	85	1358	774	—	287	9	21	469	—	3003	8·5	14	198	52	65	144	—	43	—	477	993	2·6	5019	14·3	147
West Districts.																										
Paddington	145,107	1	18	11	—	8	—	1	10	—	49	4·4				2	1		3	—	16	22	2·0	130	11·7	133
Kensington	177,605	2	19	10		5		1	17	—	54	4·0	—	1	1	1	4	—	1	—	16	24	1·8	175	12·8	168
Hammersmith	114,210	2	20	15	—	—	1	1	15	—	52	5·9	1	4	1	—	1	—	1	—	7	15	1·7	103	11·8	100
Fulham	143,102	1	67	27	—	6	—	—	16	—	117	10·7	—		1	3	7		1	—	34	55	5·0	177	16·1	197
Chelsea	74,018	—	20	12	—	4	—	—	4	—	40	7·0	—	1	—	—	—	—		—	9	10	1·8	71	12·5	119
City of Westminster	180,800	—	41	25	—	5	—	—	10	—	81	5·8		4	1	—	2		1	—	13	21	1·5	168	12·1	143
North Districts.																										
St. Marylebone	132,069	1	41	16		10	—	1	14		83	8·2	—	1	—	1	—		3	—	13	18	1·8	149	14·7	111
Hampstead	83,743	—	9	2	—	5	—	—	4	—	20	3·1	—	—	—	—	—		—	—	1	1	0·2	41	6·4	46
St. Pancras	236,596	—	94	58	—	19	—	2	17	—	190	10·5	—	9	5	8	13		3	—	11	49	2·7	287	15·9	145
Islington	337,298	7	109	49	—	18	—	3	34	—	220	8·5	3	—	2	6	12		4	—	19	46	1·8	307	11·9	126
Stoke Newington	51,700	—	9	4	—	4	—	—	3		20	5·0	—	—	—	—	—		—	—	—	—	—	41	10·3	43
Hackney	221,926	—	63	60		19	2	1	20		165	9·7	—	1	1	2	6		4	—	14	28	1·6	177	10·4	97
Central Districts.																										
Holborn	58,535	1	23	14	—	1	—	—	5	—	44	9·8	—	3	—	1	—	—	—	—	2	6	1·3	65	14·5	85
Finsbury	100,487	8	30	19	—	4	1	—	15	—	77	10·0	3	6	4	1	6	—	—	—	21	41	5·3	155	20·1	204
City of London	25,598	4	3	8	—	—	1	—	—	—	16	8·1	—	—	—	1	—		—	—	—	1	0·5	24	12·2	—
East Districts.																										
Shoreditch	117,980	3	27	18		16	—	—	20	—	84	9·3		11	1	—	7		1	—	37	57	6·3	195	21·5	272
Bethnal Green	129,889	17	64	18		13	—	1	21	—	134	13·4	2	1	5	1	5	—	—	—	9	21	2·1	159	16·0	145
Stepney	300,551	9	112	80	—	32	—	1	46	—	280	12·1	—	9	3	5	11	—	2	—	54	84	3·6	430	18·7	179
Poplar	169,214	3	47	26	—	26	—	—	19	—	121	9·3	—	5	2	2	8	—	1	—	24	42	3·2	221	17·0	194
South Districts.																										
Southwark	206,825	—	99	45	—	19	—	2	40	—	205	12·9	—	13	10	3	18		1	—	33	78	4·9	321	20·2	206
Bermondsey	130,218	3	44	29		11	—	—	12	—	99	9·9	2	8	1	4	4	—	1	—	12	32	3·2	185	18·5	170
Lambeth	305,102	12	76	50	—	15	3	2	31	—	189	8·1	1	2	4	4	14		6	—	44	75	3·2	342	14·6	126
Battersea	171,401	5	42	23		8	—	1	19	—	98	7·5	1	4	4	2	5		1	—	22	39	3·0	185	14·1	159
Wandsworth	241,810	—	51	43		8	—	2	19	—	128	6·9	1	4	—	6	3	—	1	—	12	27	1·5	197	10·6	109
Camberwell	282,775	—	89	44	—	9	—	—	26	—	168	8·3	—	11	4	5	6		3		21	50	2·5	274	13·6	153
Deptford	111,577	2	51	19	—	3	—	—	7	—	82	9·6	—	—	1	2	3	—	—		16	22	2·6	122	14·3	132
Greenwich	98,013	2	39	8	—	4	—	—	8	—	61	8·1	—	—	1	2	1		1	—	9	14	1·9	97	12·9	156
Lewisham	132,432	1	37	25	—	4	—	—	10	—	77	7·6	—	1	2	3	3		—	—	6	15	1·5	113	11·1	109
Woolwich	119,556	1	14	13	—	6	1	2	7	—	44	4·8	—	—	—	—	4		4	—	2	10	1·1	108	11·8	74
Port of London	—	—	—	—	—	5	—	—	—	—	5		—	—	—	—	—	—	—	—	—	—	—	—	—	—

* Including membranous croup.

22·7 per 1000 during the week ending Sept. 6th. During the past four weeks the death-rate has averaged 20·6 per 1000, the rates during the same period being 15·7 in London and 14·3 in Edinburgh. The 165 deaths of persons belonging to Dublin registered during the week under notice included 28 which were referred to the principal infectious diseases, against 23 and 24 in the two preceding weeks; of these 10 resulted from measles, 10 from diarrhœa, three from scarlet fever, three from "fever," and two from diphtheria, but not one from either small-pox or whooping-cough. These 28 deaths were equal to an annual rate of 3·9 per 1000, the death-rates last week from the same diseases being 3·8 in London and 1·5 in Edinburgh. The fatal cases of measles, which had been 20, 16, and 11 in the three preceding weeks, further declined last week to 10. The deaths from diarrhœa, which had been three and seven in the two preceding weeks, further rose to 10 last week. The mortality from both scarlet fever and "fever" slightly exceeded that recorded in the preceding week. The 165 deaths in Dublin last week included 34 of children under one year of age and 28 of persons aged upwards of 60 years; the deaths of infants considerably exceeded the number in the preceding week, while those of elderly persons showed no variation. 11 inquest cases and four deaths from violence were registered; and 61, or more than one-third, of the deaths occurred in public institutions. The causes of six, or nearly 4 per cent., of the deaths registered in Dublin were not certified.

VITAL STATISTICS OF LONDON DURING AUGUST, 1902.

IN the accompanying table will be found summarised complete statistics relating to sickness and mortality in the City of London and in each of the metropolitan boroughs. With regard to the notified cases of infectious diseases it appears that the number of persons reported to be suffering from one or other of the nine diseases specified in the table was equal to an annual rate of 8·5 per 1000 of the population, estimated at 4,579,107 persons in the middle of the year. In the three preceding months the rates had been 10·3, 10·0, and 9·4 per 1000 respectively. The rates were considerably below the average in Paddington, Kensington, Hampstead, Stoke Newington, and Woolwich, while they showed the largest excess in Fulham, St. Pancras, Bethnal Green, Stepney, and Southwark. The prevalence of small-pox, which had been declining during the five preceding months, showed a further marked decrease during August; this disease was proportionally most prevalent in the City of London, and in Finsbury, Bethnal Green, Lambeth, and Battersea. The Metropolitan Asylums hospitals contained 109 small-pox patients at the end of last month, against 1274, 837, and 305 at the end of the three preceding months; the weekly admissions averaged 19, against 260, 145, and 45 in the three preceding months. The prevalence of scarlet fever during the month under notice showed a slight decline from that recorded in the preceding month; among the various metropolitan boroughs this disease showed the highest proportional prevalence in Fulham, St. Pancras, Bethnal Green, Southwark, Deptford, and Greenwich. The number of scarlet fever patients under treatment in the Metropolitan Asylums hospitals, which had been 2222, 2439, and 2515 at the end of the three preceding months, had further risen to 2615 at the end of August; the weekly admissions averaged 292, against 274, 251, and 322 in the three preceding months. Diphtheria was considerably less prevalent during August than in the preceding month; the greatest proportional prevalence of this disease was recorded in the City of London and in St. Pancras, Hackney, Holborn, Stepney, and Bermondsey. There were 1013 diphtheria patients under treatment in the Metropolitan Asylums hospitals at the end of last month, against 960, 975, and 1008 at the end of the three preceding months; the weekly admissions averaged 145, against 146, 152, and 165 in the three preceding months. The prevalence of enteric fever last month showed a marked decline from that recorded in the preceding month; among the various metropolitan boroughs this disease was proportionally most prevalent in Shoreditch, Bethnal Green, Stepney, Poplar, Southwark, and Bermondsey. The number of enteric fever patients in the Metropolitan Asylums hospitals, which had been 127, 195, and 289 at the end of the three preceding months, had declined again to 281 at the end of August; the weekly admissions averaged 38, against 19, 38, and 49 in the three preceding months. The greatest proportional prevalence of erysipelas was recorded in Finsbury, Shoreditch, Bethnal Green, Stepney, and Southwark. The 21 cases of puerperal fever notified during the month included three in Islington, and two each in St. Pancras, Southwark, Lambeth, Wandsworth, and Woolwich.

The mortality statistics in the table relate to the deaths of persons actually belonging to the various metropolitan boroughs, the deaths occurring in public institutions having been distributed among the various boroughs in which the deceased persons had previously resided. During the four weeks ending August 30th the deaths of 5019 persons belonging to London were registered, equal to an annual rate of 14·3 per 1000, against 15·9, 13·9, and 13·8 per 1000 in the three preceding months. The lowest death-rates last month in the various metropolitan boroughs were 6·4 in Hampstead, 10·3 in Stoke Newington, 10·4 in Hackney, 10·6 in Wandsworth, 11·1 in Lewisham, and 11·7 in Paddington; the highest rates were 17·0 in Poplar, 18·5 in Bermondsey, 18·7 in Stepney, 20·1 in Finsbury, 20·2 in Southwark, and 21·5 in Shoreditch. The 5019 deaths from all causes included 903 which were referred to the principal infectious diseases; of these 14 resulted from small-pox, 108 from measles, 52 from scarlet fever, 65 from diphtheria, 144 from whooping-cough, 43 from enteric fever, and 477 from diarrhœa. No death from any of these diseases was recorded last month in Stoke Newington, while the lowest proportional mortality from these causes occurred in the City of London, Hampstead, Holborn, and Woolwich, and the highest mortality in Fulham, Finsbury, Shoreditch, Stepney, and Southwark. The 14 fatal cases of small-pox were seven above the average number in the corresponding periods of the 10 preceding years; three cases belonged to Islington, three to Finsbury, two to Bethnal Green, and two to Bermondsey. The 108 deaths from measles were 36 below the corrected average number; among the various metropolitan boroughs this disease was proportionally most fatal in Fulham, Holborn, Finsbury, Shoreditch, Southwark, and Bermondsey. The 52 fatal cases of scarlet fever showed a decline of 18 from the average number in the corresponding periods of the 10 preceding years; the greatest proportional mortality from this disease was recorded in St. Pancras, Finsbury, Bethnal Green, Southwark, and Battersea. The 65 deaths from diphtheria were 85 below the corrected average number; among the various metropolitan boroughs this disease was proportionally most fatal in Fulham, St. Pancras, Bermondsey, Wandsworth, Greenwich, and Lewisham. The 144 deaths from whooping-cough showed an excess of 30 over the average number in the corresponding periods of the 10 preceding years; the greatest proportional mortality from this disease occurred in Fulham, St. Pancras, Finsbury, Shoreditch, Southwark, and Lambeth. The 43 fatal cases of enteric fever almost corresponded with the corrected average number; among the various metropolitan boroughs this disease was proportionally most fatal in Paddington, St. Marylebone, Hackney, Lambeth, and Woolwich. The 477 deaths from diarrhœa were less than one-half of the average number in the corresponding periods of the 10 preceding years; the highest death-rates from this disease were recorded in Fulham, Finsbury, Shoreditch, Stepney, and Southwark. In conclusion, it may be stated that the aggregate mortality in London last month from these principal infectious diseases was more than 46 per cent. below the average.

Infant mortality in London during August, measured by the proportion of deaths of children under one year of age to registered births, was equal to 147 per 1000. No death at this age was registered in the City of London. Among the various metropolitan boroughs, the lowest rates of infant mortality were recorded in Hammersmith, Hampstead, Stoke Newington, Hackney, Holborn, and Woolwich; and the highest rates in Fulham, Finsbury, Shoreditch, Stepney, Poplar, and Southwark.

THE SERVICES.

ROYAL NAVY MEDICAL SERVICE.

FLEET SURGEON Theodore Julian Preston has been placed on the retired list, with permission to assume the rank of Deputy Inspector-General of Hospitals and Fleets.

The following appointments are notified:—Fleet Surgeons:

J. Dudley to the *Impregnable* and A. McKinley to the *Wildfire* and for service in Sheerness Dockyard. Staff Surgeons: J. W. O. Underhill to the *Camperdown*; H. Elliott to the *Lion*; and B. C. E. F. Gunn to the *Severn*. Surgeons: R. T. Gilmour to the *Cæsar*; H. E. Fryer to R. M. Infirmary, Portsmouth; G. M. Eastment to the *Redbreast*; and E. F. Ellis to the *Gleaner*.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel D. L. Irvine has embarked for India. Major F. S. Le Quesne, V.C., and Major L. R. Colledge have been posted for duty to the Western District. Captain A. H. Morris has been posted to the Bombay Command for duty. Captain A. O. B. Wroughton has been instructed to join the Woolwich District for duty. Lieutenant-Colonel H. H. Stokes, retired, has been selected for appointment to the medical charge at Oxford, vice Major R. C. Lever. Lieutenant George H. Usmar resigns his commission. Temporary Lieutenant M. Taylor is granted the temporary rank of Captain whilst employed in South Africa.

IMPERIAL YEOMANRY (IN SOUTH AFRICA).

5th Battalion: Temporary Captain P. Davidson, D.S.O., Medical Officer, relinquishes his commission and is granted the honorary rank of Captain in the Army, with permission to wear the uniform of the corps. Dated July 12th, 1901.

VOLUNTEER CORPS.

Royal Garrison Artillery (Volunteers): 1st Banff: Surgeon-Captain F. W. Grant to be Surgeon-Major.

Rifle: 6th Volunteer Battalion the Royal Scots (Lothian Regiment): Surgeon-Captain J. Cameron to be Surgeon-Major (dated Sept. 6th, 1902). 2nd Volunteer Battalion the Northumberland Fusiliers: Major R. S. White to be Lieutenant-Colonel, and to command under paragraph 55A Volunteer Regulations (dated Sept. 6th, 1902); Frederick Newman Grinling to be Surgeon-Lieutenant (dated Sept 6th, 1902). 1st Volunteer Battalion the Leicestershire Regiment: Surgeon-Captain W. P. Peake is borne as Supernumerary whilst serving with the Bearer Company of the Leicester and Lincoln Volunteer Infantry Brigade (dated Sept 6th, 1902). 3rd Volunteer Battalion the Royal Welsh Fusiliers: The undermentioned Surgeon-Captains to be Surgeon-Majors:—R. A. Prichard (dated Sept. 6th, 1902) and W. J. Morris (dated Sept. 6th, 1902).

VOLUNTEER INFANTRY BRIGADE BEARER COMPANY.

Harwich: Surgeon-Lieutenant F. E. A. Webb, from 3rd (Cambridgeshire) Volunteer Battalion the Suffolk Regiment, to be Surgeon-Captain. Dated July 14th, 1902.

SURGEON-GENERAL SIR W. D. WILSON, K.C.M.G.

Surgeon-General Sir W. D. Wilson, who has arrived from South Africa, is, we understand, to take up the appointment of Principal Medical Officer in Ireland. We have more than once had occasion to refer to the valuable services which this officer has rendered throughout the long and arduous campaign in South Africa—services which have, by the way, received very scant and inadequate recognition in the official despatches published at the end of the war. It is difficult to conceive a more responsible post than that which fell to the lot of Surgeon-General Wilson to occupy; he was unremitting in his work and he did it most conscientiously and well and often under very trying circumstances. He had earned for himself a high character as an excellent all-round medical officer and very capable surgeon before he was nominated to conduct what turned out to be the biggest piece of medical administration on record as far as this country is concerned. In South Africa he had to encounter and overcome great and unexpected difficulties arising out of epidemic sickness attributable to purely military causes, such as loss of big convoys, the enemy's occupation of the waterworks near Bloemfontein, the failure of transport, and other occurrences which are well known and over which he had really no control. There is one thing, however, upon which, in a self-seeking and advertising age, he may fairly be congratulated—namely, on his having throughout maintained a dignified reserve and being content to go on manfully doing his duty to the end, leaving the facts and results to speak for themselves.

THE ARMY MEDICAL STAFF COLLEGE.

A commencement has been made in carrying out the War Office scheme for the special training in future of candidates for the Royal Army Medical Corps in London instead of at Netley as heretofore. The recently formed Army Medical Staff College has begun its first session in the metropolis. The work of the college is now being conducted at the building of the Royal College of Physicians of London and Royal College of Surgeons of England on the Thames Embankment. Lieutenant-Colonel H. E. R. James, commandant of the depôt and training-school of the Royal Army Medical Corps at Aldershot, who has been selected for commandant and director of studies in the new college, and the officers undergoing instruction, are being accommodated at the Hotel Belgravia, Victoria-street, by War Office arrangement. From all we hear this should prove satisfactory as a temporary measure. Those quartered at the Hotel Belgravia are called upon to pay a daily contribution, fixed at a reasonable rate, out of their daily pay and allowances towards their accommodation and messing. Their time will be pretty fully occupied during the day with their studies at the college, but they will have an hour's interval for luncheon and be expected to dine together in the evening at the hotel where messing has been provided for them.

OUR RECRUITING DEPÔTS.

Readers of THE LANCET scarcely need to be reminded that we have repeatedly called attention to the unsatisfactory position and character of the buildings usually provided as barracks for recruiting purposes. Instead of being clean, commodious, cheerful, and attractive-looking buildings, occupying good and prominent positions in our cities, they are commonly quite the reverse and are calculated to act rather as deterrents than as incentives to enlistment in the army. We are glad to notice that this subject has recently called forth a communication from "A Recruiting Officer" to the *Times*. What we should like to see, and what we feel sure it would well repay the Government in the long run to provide, would be something in the nature of a soldiers' institute—a good, cheerful-looking, well-appointed building in a suitable position instead of being hidden away in some back street. The building should be well lighted, of neat and cleanly appearance, and provided with good waiting-rooms, offices, and lavatories, and be capable, in short, of acting as an attractive advertisement of the army as a career offering inducements worthy of attention and consideration on the part of those starting in life and seeking employment.

PRESENTATION TO MR. E. H. WORTH, M.R.C.S. ENG., L.R.C.P. LOND., L.S.A.

At St. Thomas's Hospital on August 20th Civil Surgeon Erskine H. Worth, on his return from South Africa, was handed an inlaid repeating travelling clock forwarded by the colonel and officers of the Sherwood Foresters (1st Derbyshire Regiment), now stationed in Pretoria. The presentation was in recognition of the unflagging energy and ability displayed by him while on medical duty with the regiment during a period of its most active service in the Transvaal. Civil Surgeon Worth was in South Africa for two years and a quarter. He was attached first to the 7th Brigade Field Hospital at Ladysmith and accompanied General Buller's force as far as Lydenburg, at which place he was transferred to the Gordon Highlanders. From there in turn he served at Pretoria and Johannesburgh, and was in medical charge for a time at Krugersdorp where he joined the 1st Derbyshire Regiment and accompanied them for several months in their treks under Colonel Kekewich, he having special care of the Boer women and children. Finally, he saw active service in Cape Colony with the Yeomanry.

A NEW PATTERN AMBULANCE WAGON

It will be remembered that as the result of experience in the late South African campaign the present pattern ambulance wagon proved to be unsuitable and a failure. The topographical features of the country and the conditions under which the war had to be conducted were no doubt quite exceptional, but the present wagon has long been regarded by many people as too heavy and complicated and as being capable in some other respects also of great improvement. We learn from a Woolwich correspondent to the *Army and Navy Gazette* that in consequence of the Government having invited designs for a new army ambulance wagon of light construction several private firms and the Royal Carriage Department, Woolwich Arsenal, have entered into competition. The latest arsenal ambulance as designed is larger than the wagon now in use. It weighs

32 cwt., will accommodate six wounded soldiers, and is furnished with india-rubber tyres and curtains.

THE SOUTH AFRICAN ARMY AND ITS CASUALTIES.

From a War Office return recently published we learn that from first to last the number of officers and men sent out to, or raised in, South Africa nearly reached the very large total of 450,000. The garrison in South Africa prior to the outbreak of the war numbered 12,546, and from its commencement on Oct. 11th, 1899, to May 31st last there were in addition 435,889, so that a total of 448,435 altogether were engaged in the military operations. Although the exact number of deaths to May 31st, 1902, is uncertain the losses in killed in action and the deaths from wounds, disease, and accidental injuries amounted to 21,942 (officers and men). Altogether 22,829 were wounded, including those who died from their wounds, and on the cessation of hostilities there were 291 officers and 9422 men in hospital in South Africa.

Correspondence.

"Audi alteram partem."

SOME RECENT CHICANERY IN SCIENCE.

To the Editors of THE LANCET.

SIRS,—I have carefully studied the paper on the Life-history of Filaria Bancrofti and Filaria Immitis by Dr. L. W. Sambon in your issue of August 16th, p. 422, and should like to say that I for one fully concur in his criticism of the work which Professor G. B. Grassi and Dr. G. Noè claim to have done in connexion with *filaria Bancrofti* and *filaria immitis*. The experiments said by these authors to have been made by them with a view to infect dogs by the bites of mosquitoes previously infected by the latter parasite were, on their own showing, badly designed and performed without due safeguards against error and were evidently rushed through and reported in haste, probably in order to forestall other observers. The observation to the effect that a number of filariated mosquitoes lost all their filariæ after a single feeding on a dog is so improbable as to suggest that it is entirely apocryphal; and, as Dr. Sambon clearly proves, the rest of the work is equally worthless as a proof of the inoculation hypothesis of filariasis—an honour which the authors have had the assurance to claim for it.

Very little examination, however, suffices to show that the work is not a serious effort of science, but only an attempt to peg out a fresh claim for priority by, or on behalf of, Professor Grassi. One notes at once that he adopts in his new enterprise precisely the same devices as he used previously in connexion with the mosquito theory of malaria. The moment Dr. Low's work was published, he hastily issued with Dr. Noè a "preliminary note" in which he began by implying (but without giving details) that he himself had independently made the same discovery—a thing which I have reasons for disbelieving; and then proceeded to depreciate Dr. Low's work by inventing imaginary faults in it—an artifice which he consistently adopts in regard to my own work. Having thus shifted the merit of the inoculation hypothesis of filariasis to his own credit, he permits his pupil, Dr. Noè, to draft the entire subject into his account by saying that "the Italian discovery now at last enables us to place the prophylaxis of filariasis upon a solid basis." Needless to say, neither he nor his pupil has ever made a single new observation on filariasis; while, even as regards *filaria immitis* of dogs, the mode of propagation was discovered, not by them, but by Calandruccio guided by Manson's previous work. And now, when the actual experiments which we were told would support this extravagant claim are published they turn out to be worth nothing at all.

I have long had a very familiar acquaintance with a certain order of Italian literature on cognate subjects and may take the present opportunity to warn others against accepting too readily, as some appear to do, the claims of priority or even many of the observations contained therein. Whenever a new discovery is announced the authors of these works are pretty sure to attempt to obtain the principal credit of it by publishing hasty "preliminary notes" suggesting that they had already made it, followed by endless monographs disparaging their predecessors, distorting the whole history of the discovery, and recording observations which turn out to be for the most part either easy confirmatory work or else entirely wrong. Take, for instance, the whole history of our knowledge of malaria—the invention of the bacillus malariæ by Crudeli and Klebs; the efforts of Marchiafava, Ceili, and Bignami upon Laveran's discovery (so well exposed by him in his "Traité du Paludisme," p. 42); the *amœba guttula* of Grassi and his colleagues; the "proof" of the mosquito theory of malaria by Bignami; and the "discovery" of the "*anopheles malariferi*" by the epidemiological studies of Grassi, to name only a few, and by no means the worst examples. The very peculiar methods adopted by Grassi, especially for securing scientific distinction for himself, have already been publicly commented upon by Parona,[1] Calandruccio,[2] and myself,[3] and are now ably scrutinised by Dr. Sambon. The skill, subtlety, and audacity of the chicanery employed in the efforts referred to deceive easily the cursory reader; but really the more careful student is beginning to be somewhat sceptical when he sees the announcement of a new "Italian discovery." I refer, of course, only to this particular school of Italian writers.

It is a question how to deal with such efforts. In my humble opinion science is too great a thing to be made a field for tricks like those of a pettifogging village attorney and we have every right to resent their introduction. Moreover, absolute honesty is the first qualification in all scientific work and the man who attempts to deceive his readers on questions of priority can hardly complain if we refuse to believe in his researches—a person who will deceive in one respect will deceive in another. Others may do as they please, but for my own part (as I have already publicly stated) I fear I cannot do myself the honour of including the labours of Professor G. B. Grassi in any future writings of my own and I think that science will not lose much if the papers by him and Dr. Noè on filariasis are similarly excluded from monographs on that subject.

I am, Sirs, yours faithfully,

Sept. 6th. RONALD ROSS.

P.S.—Two other instances of the same kind have just been brought to my notice. Early last year Nuttall published a note announcing the important observation that *anopheles* can exist where there is no malaria. Some time later Celli published similar observations but stated that Nuttall's work "confirmed" his—implying, quite erroneously, that Nuttall's observations were secondary to his. Again, in 1899 Grassi[4] published a note stating that he had found *piroplasma bigeminum*, a parasite of cattle previously known to be inoculated by the bites of ticks, in the salivary glands of those arthropods, and promising to publish the full account of the discovery later. Needless to say, the full account has never appeared. It will be interesting to note what happens when someone really does make the discovery.

INSANITY AND LONG SEA VOYAGES.

To the Editors of THE LANCET.

SIRS,—At a period of the year when people in delicate health are already making their plans to escape from the drawbacks of an English winter, and medical men are constantly being consulted as to the advisability of this or that course, a note of warning in respect to some cases may not be out of place. It is especially to those cases which exhibit a tendency to melancholia that I wish to refer—those who, from worry, bereavement, or overwork, have become chronically run down and who at last seek in change and travel the necessary stimulus to enable them to weather the storm. With such, change is often beneficial, but long sea voyages are quite a different matter. To allow such patients to undertake unattended, as is too often done, long runs even on fast liners is a grave mistake. It is thought that the pleasant companionships and the facilities for social intercourse, which are the most charming characteristics of life on board these floating hotels, combined with the exhilarating influence of the sea air and the uneventful restfulness of

[1] Parona: Sulla Questione del *Bothriocephalus latus*, Gazzetta Medica Italiana-Lombardia, 1887, 1888 (three papers).
[2] Calandruccio: Unicuique Suum, Professor G. B. Grassi: C. Mariani et Cie., Rome.
[3] Ross: Le Scoperte del Professor G. B. Grassi sulla Malaria—Policlinico, 1900 and 1901.
[4] Grassi: Rendiconti della R. Accademia dei Lincei 1899.

long days free from even an echo of the world's turmoil, cannot but prove beneficial to those whose nervous systems have been overwrought. All this is excellent in theory, but in practice it leads to anything but satisfactory results. It is quite true that there are plenty of opportunities for pleasant companionship and amusements of all kinds, but only for those who care to seek them; there are few places where a man can isolate himself from his fellow-creatures and be alone in a crowd so easily as on board ship. And this is exactly what happens with a person suffering from mental depression or from *ennui*; he does not seek to mix with his fellow passengers, he has no inclination to do so and consequently he is ignored by them; he sits for hours together in his deck chair, incapable of concentrating his thoughts on a book, and simply brooding over his worries, supposed or real. He has no opportunities for exercise, the decks are generally too crowded with chairs for that; he has not the ordinary little incidents of every-day life on shore to rouse him; he has no theatres to go to where he can be amused without any effort on his own part; in a word, he cannot get away from himself. Under these conditions it is easy to see how what was merely a tendency before will rapidly become confirmed melancholia. He has nothing to look at but the eternal ring of blue sea of which the ship is the centre; he has no ears but for the noise of the swirl of the water against the ship's side, which to him soon becomes irritating; and the regular throb of the engines only beats a tune to his depressing thoughts. What should be repose and quietude becomes an endless monotony; if he seeks refuge in sleep during the day his nights will in consequence be sleepless and after a week or 10 days of such a life his condition will be worse than when he started.

But there is another factor which must not be lost sight of in connexion with these cases and that is the over-stimulating effect of the saline breezes whose influence for good is so confidently looked forward to. Their action, however, is purely physical and this constant physical stimulation coinciding with constant and increasing mental depression is apt to bring on, if the voyage is protracted, paroxysms of acute mania, and it is not infrequent to find on board ship among these patients very typical examples of what the French call *la folie à double forme*.

In long voyages on sailing ships these dangers are increased tenfold and on no account should such patients be allowed to contemplate such a step. The therapeutical value of sea voyages in many classes of diseases cannot be overrated, but where there is the least sign of incipient insanity in any of its forms or merely a condition with a remote possibility of such a contingency they should be most strongly deprecated. In any case the patient should never be allowed to travel alone or merely with an attendant of whom he cannot make a social companion; he should be with a friend or a member of his family and best of all with a party. It should always be borne in mind that the ocean, with all its fascination, with all its healthful properties, has an element of world-weariness about it which even hardened sailors experience and from which they only escape by the multifarious duties of their calling.

I am, Sirs, yours faithfully,

Sept. 5th, 1902. LOUIS VINTRAS, M.D. Durh., B.Sc. Paris.

INTESTINAL SAND.

To the Editors of THE LANCET.

SIRS,—With reference to Dr. A. Crombie's letter[1] commenting on that part of my note on "True" Intestinal Sand,[2] which related to his remarks during the discussion on the paper read by Sir Dyce Duckworth and Dr. A. E. Garrod at the Royal Medical and Chirurgical Society in 1901, I wish, in the first place, to thank Dr. Crombie for dispelling the doubt I had as to the nature of his cases. In his remarks on the above-quoted occasion he made no reference to the very important fact that the specimens had been subjected to a chemico-microscopical examination, and in the absence of such a statement I naturally concluded that the specimens had not been so examined.

Might I suggest to Dr. Crombie that he should publish an account of his cases? These cases of intestinal sand appear to be of such rarity that any contribution to our knowledge of the condition—especially when clinical facts can be supplemented by the results of analysis—cannot fail to be of much interest. I note that Dr. Crombie has quite recently had a case of pernicious anæmia in which small quantities of intestinal sand were detected. It is to be hoped that in this case a complete analysis of the sand was made. I infer that this was done, as Dr. Crombie describes it as a case of "true" sand, and, of course, the differentiation from the false variety can only be made by analysis and microscopical examination.

May I venture one comment on the case referred to in the last two sentences of Dr. Crombie's letter? The patient therein referred to had, previously to consulting Dr. Crombie, been "living an ordinary life on mixed diet," and Dr. Crombie noted that no tinned Californian fruits had been eaten for the previous three months. Mixed diet would in Calcutta include, in all probability, fresh plantains or bananas and might include figs. It is well recognised now that these fruits may give rise to "false" intestinal sand as well as the pears which Dr. Crombie excludes from the possibilities of his patient's dietary.

In conclusion, it may be of interest to state that since the publication of my note on this subject I have been afforded, through the kindness of Major D. M. Moir, I.M.S., an opportunity of examining a specimen of intestinal sand which he received in 1892 from Dr. Birch, then principal of the Calcutta Medical College. I could not obtain any clinical facts in connexion with the specimen. There were unfortunately only remaining a few grains of this specimen and so it was impossible to make a full quantitative analysis. The results obtained were as follows: moisture, 3·94 per cent; inorganic matter, 7·62; and organic matter, 88·44. The microscopical appearances were very similar to those obtained in the specimen of "true" sand already described by me. In this case the percentage of *inorganic* matter (7·62) accords more nearly with the amount which has been previously found in specimens of "false" sand (generally from 2 to 3 per cent.); but the micro-copic appearances and the results of treatment with various reagents while the specimen was under the microscope correspond with those obtained in the case of "true" sand. I am inclined, therefore, to regard this specimen as one of "true" sand with an unusually small proportion of inorganic constituents.

I am, Sirs, yours faithfully,

C. H. BEDFORD, D.Sc., M.D. Edin.,
Major, I.M.S.; Chemical Examiner to the Government of Bengal. Calcutta Medical College, August 19th, 1902.

P.S.—In my paper above referred to the date of Professor Delépine's paper was misprinted 1900. It ought to have been 1890.

[1] THE LANCET, August 2nd, 1902, p. 314.
[2] THE LANCET, July 26th, 1902, p. 215.

THE LOW PHOSPHATES AND UREA IN THE URINE OF THE TUBERCULOUS.

To the Editors of THE LANCET.

SIRS,—In your issue of Sept. 6th, p. 656, I read with much interest Mr. E. G. Clayton's valuable contribution on Some Observed Variations in the Phosphates and Urea of Urine. Mr. Clayton says: "The unusually low phosphates and urea in the case of tuberculosis and in sample B, as well as the evident general correspondence of the preparations of both constituents in the varying conditions represented seem to be the points most worthy of remark." The analysis of urine in the case of tuberculosis of the bladder confirms my argument as to the value of pure urea in the treatment of tuberculosis. In my papers on urea published in THE LANCET of March 9th (p. 694), June 15th (p. 1672), and Dec. 7th (p. 1567), 1901, I stated that the tuberculous are deficient in nitrogen and that urea given with abundance of animal food supplies this deficiency and is the best remedy that at present we possess. Further, "that tuberculosis bears an inverse ratio to the amount of proteid consumed—that is to say, the less animal food ingested the greater the number of tuberculoses, and *vice versâ*." "For years I have been struck with the low specific gravity and deficiency of solids in the urine of this class of patients."

I am, Sirs, yours faithfully,

Nottingham, Sept. 8th, 1902. H. HARPER, M.D. R.U.I.

WOMEN INSPECTORS OF THE LOCAL GOVERNMENT BOARD.

To the Editors of THE LANCET.

SIRS,—I am afraid that your Welsh correspondent has not devoted much study to the question of boarding out pauper

children or he would be aware that there are *three* inspectors of boarding-out. These ladies were appointed to see that the committees did their work well, and if your correspondent will go through the reports of Miss Mason he will find that certain of the committees did it very badly—so badly that in some cases the Local Government Board refused to allow them to take any more children and in at least one case cancelled the order. It is the committees that Miss Mason and her colleagues inspect, and to gain that knowledge of the way they do it they have to visit a considerable number of the children "boarded out *beyond the union*" The inspectors have nothing to do with children boarded out *within the union*, and when I state that while the children boarded out beyond the union number less than 1900 those boarded out within the union number upwards of 5600, it will be at once seen that less than a third of the children are even liable to be inspected by the officials of the Local Government Board. I am no advocate of women indecently usurping men's place in public administration, but I do think that girls boarded out, either singly or with societies or sisterhoods, should be inspected by women if only to prevent the recurrence of a scandal similar to the one that has just occurred in Lancashire.

I am, Sirs, yours faithfully,

JNO. MILSON RHODES, M.D. Brux.

Didsbury, Sept. 8th, 1902.

HAS ACUTE ANTERIOR POLIOMYELITIS BEEN UNUSUALLY PREVALENT DURING THIS SUMMER?

To the Editors of THE LANCET.

SIRS,—I see a letter in THE LANCET of Sept. 6th, p. 707, from Dr. F. E. Batten stating that in his experience acute anterior poliomyelitis has been unusually prevalent during the present summer In answer to his query I may say that I have been struck with the number of cases of this disease which I have met with during the past few weeks and I was therefore very interested to read the letter above referred to.

I am, Sirs, yours faithfully,

Cardiff, Sept. 8th, 1902. W. MITCHELL STEVENS.

NOTES FROM INDIA.

(FROM OUR SPECIAL CORRESPONDENT.)

Another Threatened Plague Outbreak.—The Death-rate in Madras City.—Infant Mortality in Bombay and Calcutta.

THE mortality from plague throughout India has been steadily rising during the past few weeks. For the week ending August 9th the deaths were 2854, while for the past week (ending the 16th) they have risen in number to 3762. The rise has not been limited to one province but is almost general. The figures for the week are: Bombay Presidency, 2642, as against 2225 for the previous week; Madras Presidency, 145, as against 144; United Provinces, 153, as against 29; Punjab, 106, as against 23; Mysore, 612, as against 392; Berar, 34, as against 18. The only province which shows a decline is Bengal, where there were only 10 deaths, and in the city of Calcutta only nine deaths. Plague is gradually creeping nearer Simla, Kasauli having had already 11 deaths. These increasing deaths, taken in conjunction with a rise at the corresponding period last year, are a sufficient indication of what we may expect, and now that the disease has extended to so many provinces its ravages are likely to be enormous. Moreover it shows that the great Punjab inoculation scheme has hardly been taken in hand sufficiently early. The medical officers are not all distributed—in fact, they have not all arrived in India—and the organisation of the work is far from complete. This inoculation scheme should give an opportunity for testing other fluids than that of Haffkine. While the advantages of this serum are unquestionable it is admittedly open to improvement and it possesses certain drawbacks. The serum of the Berne Institute may be mentioned as deserving further trial as a curative agent.

I have had from time to time to draw attention to the high death-rate in Madras city. During the past year it has been 55·5 per mille, as against a mean of the previous five years of 40·9. It is said that the climatic conditions were unfavourable, but the water-supply was imperfect and the drainage defective and inadequate. What Madras wants is a bold scheme of improvement for opening up the congested portions of the city similar to the work now being carried out in Bombay. The municipal finances are such that any great scheme cannot be entered upon without Government assistance and already they are under the burden of 30 lakhs for drainage. A better system for the registration of the causes of death is urgently called for. Improvements in this direction have been made both in Bombay and in Calcutta. I hear that in Calcutta every death is inquired into and that from the history of the illness the district health officer is able to form an estimate of the probable cause of death. Though admittedly imperfect this is vastly superior to dependence upon the mere statements registered at the burning ghauts or burial-grounds by the deceased's relatives. Failing the certificate of a medical practitioner this seems the only possible means of obtaining anything like a probable estimate of the cause of death. I doubt if anything so thorough as this is done anywhere else in India.

The 37 medical men who are coming out to India for plague work in the Punjab will be inoculated shortly after arrival in Bombay and they will be detained for a short instruction at the Research Laboratory before being sent forward for duty.

The infant mortality in Bombay is apparently enormous. For last year the rate of male infant mortality was 571 in 1000 of the births, and the female ratio was 589. The Government declines to accept the theory that the registration of births is defective. Very much the same high mortality prevails in Calcutta where the deaths of infants under one month have been found to be excessive. But for this city the health officer considers the low birth-rate recorded as due largely to deficient registration. The deaths of infants under one year were at the rate of 406 5 per 1000 births, but the birth-rate is only about 10·7 per 1000 of the population.

August 25rd.

HOSPITAL ABUSE.

(FROM OUR SPECIAL COMMISSIONER.)

The Leigh Medical Society and the Proposed New Hospital—United Action of the Medical Profession to Prevent the Creation of Conditions that lead to Abuse.

THE proposal to build a hospital at Leigh was brought before the Ethical Section at the recent annual meeting of the British Medical Association. The remarks made by Dr. F. E. Wynne, a local practitioner, were published at the time. He pointed out that there was no need for an out-door patient department, that it would compete unfairly with the practitioners of the district, and that its creation had been proposed so as to obtain subscriptions from the working-classes. The medical men concerned had protested but had been treated with scant courtesy and they had been threatened with the importation of an outside surgeon who would be encouraged to practise in opposition to them. It seemed to me a rather serious matter if a scheme for a hospital should even at its inception thus assume a hostile attitude towards the profession. Consequently I went to Leigh to inquire on the spot and to obtain fuller details. Here I found that what is called Leigh is really an amalgamation of three districts; West Leigh, Pennington, and Bedford, which together have, according to the census of 1901, a population of 40,001 inhabitants. It is a colliery and manufacturing district six miles from Wigan, seven miles from Bolton, and 12 miles from Manchester. But within two miles there is the district of Atherton with 16,211 inhabitants, and at a distance of two and a half miles there is the town of Tyldesley with 15,000 inhabitants. Adding these two figures to the population of Leigh we have some 71,000 persons for whom there is no hospital. Apart from the ordinary cases that require hospital treatment severe colliery accidents occasionally occur and it is certainly a hardship to have to convey such patients all the way to Wigan or to Manchester for hospital treatment. The population of these places is growing; Leigh is a convenient centre and if a hospital were built in this town it would certainly render considerable and welcome service. Therefore, when rather more than a year ago a movement was set on foot having for its purpose the building of a hospital it was widely approved by the members of the medical profession as well as by the other sections of the community. A town's meeting

was convoked which elected a large committee to promote the project. The mayor, members of the town council, all the clergy, and the medical men were appointed members of this committee.

It was not till this general committee had met a few times that differences began to arise. The general committee appointed an executive and only one medical man was selected to serve on this body. The executive proceeded to invite architects to submit plans for the proposed hospital and these were to comprise an out-patient department with a waiting-room large enough to hold more than 100 persons. Thereupon the Medical Society of Leigh made a formal protest and appointed a deputation to wait upon the hospital committee. The members of this deputation do not consider that they were well met; in fact, it seems as if they were treated rather rudely. In any case, the medical practitioners of Leigh were so far offended that they determined that they would have nothing more to do with the matter unless they were specifically invited to help. But now that some time has elapsed since these regrettable incidents occurred the matter is viewed in a calmer light and it is acknowledged that the medical men have been somewhat remiss in educating those with whom they had to deal. What is obvious to a medical practitioner is not necessarily understood by those who are outside the profession. Now that there has been time for explanations and friendly discussion the standpoint of the profession is much better understood, notably by the mayor, the secretary of the local coöperative society, who is a town councillor, and others. Undoubtedly, the Medical Society of Leigh ought from the very onset to have laid their case before the general public. Many misunderstandings would thus have been prevented and the members of the profession would not have been subjected to unjust aspersions. There are 15 or 16 local practitioners and, with one exception, they all belong to the Medical Society which was founded four years ago as a medical guild or union organised to deal with economic questions. The one exception will work with the Medical Society in regard to the hospital question and therefore it may be said that the local practitioners are unanimous. They do not object to the creation of a hospital but they maintain that an out-door patient department is not needed and would be very injurious to the profession. There is, for instance, a colliery in the neighbourhood where as many as 3000 men are employed. From time to time serious accidents occur in the pits and it is in view of such catastrophes that there is need for a hospital. But there are also ironworks, manfactories of agricultural implements, and some small industries. Here minor accidents occur consisting generally of injuries to the hand or the eye. The patients in such cases can easily walk to a practitioner's private surgery; no hospital is required for such slight accidents. The employers at these various firms sometimes pay a regular sum to local practitioners to attend any of their workmen who may be injured. Some of these practitioners receive £20 a year from several firms and would not be able to live if these payments were withdrawn. But if there were a hospital with an out-patient department these employers would probably subscribe to the hospital instead of paying a local practitioner, and would send their workmen to the out-patient department where they would be treated for nothing. Indeed, the employers could save money in this way while figuring as patrons of the local charity. On the other hand, the money which now enables several practitioners to make both ends meet would be swallowed up by the hospital.

In large centres where there is a great mass of poverty it may be necessary to have out-patient departments at some of the hospitals. At Leigh there is comparatively little poverty. There is little or no casual labour. The inhabitants for the most part are in regular employment. Drunkards and men with very large families may find it difficult to pay their way; but, as usual, the medical practitioners are constantly attending gratuitously on such cases. Therefore they maintain that there is absolutely no need for an out-patient department and this assertion is confirmed by the fact that there is as yet no medical charity whatsoever at Leigh. If the necessity for a medical charity has not yet been felt, why should such an institution be forced on to the community merely because there is need for surgical wards to meet emergencies when serious accidents occur? A serious case requiring indoor hospital treatment is a very different matter. Nevertheless, the plan for the hospital which has been adopted includes a large out-patient department. The only concession which as yet has been made to the medical profession is the abandonment of a proposal that the paid house surgeon of the hospital should visit patients in their homes. This, in any case, has been recognised as unfair competition, so that some advantage has already resulted from the united action of the members of the profession. The local practitioners are inclined to boycott the hospital unless the managers consent to limit very strictly the out-patient department. It is true that as yet the exact meaning of the word "limit" has not been defined, but it is felt strongly that for small accidents and ordinary illnesses the great mass of the population can afford to pay at least minimum fees. On the other hand, where well-established cases occur for which such payments cannot be made the local practitioners are willing to treat such cases at their own surgeries gratuitously. Why, then, should there be an out-patient department, where it will be almost impossible to prevent abuse, when the local practitioners are willing to attend necessitous cases gratuitously? Why increase the cost of building the hospital by adding an out-patient department and then augment its working expenses when all that is really needed will be supplied from the private surgeries of the local practitioners without involving the subscribing public in any cost whatsoever? But there are working men colliers on the hospital committee and they insist on the creation of an out-patient department. On the other hand, would they so insist if they did not anticipate that such a department would be the means of obtaining for many cheaper medical attendance? It is this tendency which the local practitioners are in self-defence bound to resist. Where charity is needed they will give it; where the patient can afford to pay they demand such payment. But the aim is to avoid full payment by means of penny subscriptions and, on the other hand, to disguise charity under the cover of these small donations. If the members of the profession hold out it is difficult to see how the hospital can be managed. A junior paid house surgeon cannot do all the work. A visiting staff selected from among the local practitioners must be formed, but this will not be possible if these all refuse to serve.

One cause of the present difficulty is the precedent established by the hospitals of Wigan and Bolton. In both these towns there are out-patient departments to the hospitals and the workmen there are in the habit of subscribing to these hospitals, so the workmen of the Leigh district naturally imagined that they would be able to do the same in regard to the new hospital which it is proposed to build. But at Wigan and Bolton there are endowments and old-established charities which tie the hands of the managers. Nothing of the sort exists at Leigh. From the Wigan hospital eight tickets of recommendation are obtained for a guinea subscription and this is a proceeding that lends itself to much abuse. Reform is greatly needed in regard to this matter at Wigan. At Oldham only two tickets are given in exchange for a guinea subscription entitling the patient to one month's treatment. What has proved to be a cause of much abuse in the two nearest towns should serve as a warning rather than as a precedent to be followed.

After talking these matters over with several local practitioners I called on the secretary of the hospital committee to see what might be said on the other side. But the secretary energetically protested that he did not belong to any side and was earnestly endeavouring to be absolutely impartial. He thought that every practitioner in Leigh had a large free list and that it would be to their advantage if these non-paying patients were transferred to the out-patient department of the hospital. All new comers to the district were besieged by these bad-paying patients. Nor would it be altogether wise to send those who really could not pay to the Poor-law medical officer. The class that went to the parish medical officer would soon conceive that as they got medicine for nothing they might as well endeavour to get milk for nothing, and finally they would come down on the parish for permanent relief. The hospital outdoor patient department would draw off this class and would help to prevent pauperisation. But if such results were likely to be beneficent there certainly was a great danger of abuse. To prevent this it would be necessary to draw up very stringent rules and the secretary also thought a medical receiving committee should be formed so as to see that only worthy subjects for charity were admitted. The hospital, it was estimated, would cost about £13,000 and £9000 had already been promised. The land had been given to them by Lord Lilford and therefore there is every hope that the scheme will be carried out. They might get the foundations cut this year and commence building next

year. There will be a pavilion of two storeys, with a ward for 15 beds on each floor. The one will be the female, the other the male, ward. Then there are the administrative buildings and the out-patient department; but the plan is so contrived that this latter could be left out altogether. There is space remaining on the land for the building of more wards should the necessity arise, which, judging from the present rate of increase in the population, is likely to be the case at a future date. It seems certain that the project to build a hospital will be realised, so that here there is a test case. There is, on the one hand, the well-established fact that hospital abuse exists on a large scale throughout the country. On the other hand, a certain number of medical unions have been formed to deal with this and other economic questions. The Medical Society of Leigh is especially favoured in having secured the unanimous support of all the local practitioners. There could be therefore no better opportunity for the practical demonstration of the utility of such a medical union. It is to be hoped that the medical practitioners of Leigh will rise to the occasion and set an example that will be useful throughout the United Kingdom. They are not hampered by vested rights and established precedents. In respect to the question of hospital abuse they are treading on virgin soil and should therefore be able to establish a new precedent, to enforce the application of new principles, and to realise much-needed reforms

MANCHESTER.

(FROM OUR OWN CORRESPONDENT.)

Congress of the Sanitary Institute.

THE arrangements made for the annual congress of the Sanitary Institute allow of the confident expectation that the meetings which are to begin to-day (Tuesday, Sept. 9th) should be very successful. The Lord Mayor will welcome the members at the town hall, after which he will preside at a public luncheon, and at 3 o'clock he will open the Health Exhibition at St. James's Hall. At 8 o'clock in the evening Earl Egerton of Tatton, the President of the congress, will give the inaugural address at Owens College. The active business is to begin to-morrow, the 10th. Conferences will be held respectively by municipal representatives, port sanitary authorities, medical officers of health, engineers and surveyors to county and other sanitary authorities, veterinary inspectors, and sanitary inspectors, and on the hygiene of school life. To-morrow afternoon there is to be a garden party at Tatton Park on the invitation of Earl Egerton of Tatton and the Duchess of Buckingham and Chandos and in the evening the lecture to the congress will be given by Dr. W. N. Shaw, his subject being, "The Treatment of Smoke: a Sanitary Parallel." On the 11th there are to be meetings of sections—No. 1, which deals with Sanitary Science and Preventive Medicine, under the presidency of Sir J. Crichton Browne; No. 2, for subjects relating to Engineering and Architecture, with Sir Alexander Binnie in the chair; and No. 3, dealing with Physics, Chemistry, and Biology, presided over by Professor Delépine. The meetings of the sections will be continued on the 12th, and in the evening of that day Sir W. J. Collins will give a popular lecture on "The Man *versus* the Germ." Many visits and excursions have been arranged for, the various clubs are throwing open their doors to members, and much hospitality will be shown. Good, no doubt, will be done by the gathering, and the attention of a portion of the intelligent public may be drawn to some of the sanitary evils which still oppress us, but will it end chiefly in talk and not be followed by action? Will the lecture on the treatment of smoke be followed by its diminution to any appreciable extent? So long as so many evil deeds—from the point of view of sanitation—are winked at, if not expressly permitted, they will be continued whilst it pays to do so by a large proportion of the offenders. But the time has surely come when more stringent measures might be used without injury to the manufacturing interests. The appliances for smoke consumption have been greatly improved and have been found to save fuel and money, but there still seems to be some prejudice against their use. Much, also, may be gained by the more general use of gas-engines and of electric appliances. As regards personal and domestic hygiene one difficulty is to educate the most ignorant of the population, and perhaps some suggestions may be thrown out at the congress which will bear fruit.

Lunatics in Workhouses.

An inquest was held about a fortnight ago on the body of a man who jumped through a window in the workhouse infirmary at Crumpsall. He was taken in custody "for behaving in an extraordinary manner" at the Victoria Station, brought before the magistrates, acquitted of the charge of trespass, and ordered to the workhouse, but owing to some misunderstanding he was not put into the lunacy ward. The master of the workhouse stated that the medical officer did not think the man insane, but if he had done he would have had him transferred to the imbecile ward, and he would have had him brought before the magistrates within 36 hours. In reply to the coroner the master also said that if he had received an order from the magistrates he would have put the man in the imbecile ward despite the medical officer's opinion. It was further stated that no written order was given by the magistrates and the only one received was from the relieving officer, stating that the man appeared to be subject to delusions. The case was adjourned for the evidence of the medical officer.

Boys' Camp at Southport.

There is one manifestation of modern philanthropy which seems altogether good—namely, that of taking poor children for a week or two in summer to the seaside or into the country. Over 2000 city lads have lived in camp at Birkdale, Southport, since the season began in Whitsun-week. They are from the very poorest class and but for the Strangeways Refuge would have had no change from the courts and alleys in which they live. The camp is close to the sea. Most of the boys sleep in army tents, which are kept perfectly sweet and clean, but a large wooden dormitory has been recently added. Workers among the poor report to the managers of the Refuge cases likely to be benefited by a week in camp. The candidates are medically examined before going. Each working boy pays 2*s.* towards the week's expenses and each schoolboy 1*s.*, but in cases of extreme poverty this is not insisted on. The total cost of each lad's journey there and back and his stay in camp is 6*s.* On reaching camp his clothes, often merely dirty rags, are changed for a strong suit provided by the managers. The change from the confined slum to the spaciousness of the open beach is a revelation to most of the lads that carries with it something of pathos. One little fellow said: "I've never seen so much room out of doors before." And another, looking at the sea for the first time, said: "What a big cut," which is vernacular for canal, his notion of water on a large scale being derived only from the canals of the city or perhaps from the Medlock and the Irwell. They bathe every fine morning, are drilled each day, play to their hearts' content, and are abundantly fed, so that the pale, pinched-looking, undersized city children, telling of rapid and serious degeneration of race, go back wonderfully invigorated and browned. The pity is that the stay is so short and that the return in most cases is to a closed insanitary slum. At the end of the season the committee find themselves £75 in debt, but it is hoped that this will soon be cleared off and that a start will be made next year free from this burden.

Sept. 9th.

LIVERPOOL.

(FROM OUR OWN CORRESPONDENT.)

Opening of the Winter Session of the Medical Faculty of University College, Liverpool, by Sir Frederick Treves, Bart., K.C.V.O., C.B.

THE inauguration of the winter session is looked forward to by the students of the Medical Faculty of University College, Liverpool, with the greatest interest as the occasion will be a memorable one in the annals of the Liverpool school. Sir Frederick Treves has kindly accepted the invitation of the Medical Faculty of the College to distribute the prizes to the successful students and to deliver the opening address on Friday, Oct. 10th, at 2 P.M. It has been arranged that the professorial staff and the former students of the college, wearing academic costume, shall walk in procession from the college in Brownlow-hill to the Philharmonic Hall, where the ceremonies will take place. The hall is a spacious one and is capable of accommodating some 3000 persons. Special efforts have

been made by the dean of the medical faculty to trace former students, many of whom have already received invitations to attend the ceremony. If those who have not received invitations will convey to Dr. F. R. Bradshaw, 51, Rodney-street, Liverpool, their desire to be present invitations will be forwarded to them. The orchestra will be reserved for past and present students. Upon the termination of the proceedings at the Philharmonic Hall a procession on similar lines to the former one will be made to the Royal Infirmary, where Sir Frederick Treves will open the new operating theatres. Tea will afterwards be provided in the corridors by Mr. Edward Kewley, the genial chairman of the committee. The two new operating theatres at the Royal Infirmary have been erected through the generosity of an old and valued member of the committee and are equipped with all the most recent requirements of modern surgery. The biennial dinner of the medical faculty of University College will take place in the evening of the same date at the Adelphi Hotel. Sir Frederick Treves will be present, together with other distinguished guests.

Sept. 9th.

WALES AND WESTERN COUNTIES NOTES.

(FROM OUR OWN CORRESPONDENTS.)

The Census Returns for Glamorganshire.

THE complete census returns, which have just been issued for the county of Glamorgan, give some very interesting figures with regard to the amount of overcrowding in the county and by a comparison with the returns for 1891 it is possible to ascertain to what extent the conditions found in 1901 differ from those existing 10 years earlier. In the census report for 1891 it is proposed that tenements should be considered overcrowded when occupied by more than two persons to each room, and applying this standard among the tenements of less than five rooms in the whole county 8 per cent. were overcrowded in 1901, while in 1891 the percentage was 12. In the county borough of Cardiff the overcrowding was reduced from 9 per cent. in 1891 to 6 per cent. in 1901 and in Swansea during the same period the reduction was from 12 per cent. to 8 per cent. In the urban districts of the county 9 per cent. and in the rural districts 6 per cent. of the tenements indicated were overcrowded in 1901. Except in Merthyr there is shown to be a marked decrease in the large urban districts during the 10-year period. In Aberdare the percentage fell from 10 to seven, in Mountain Ash from 12 to eight, in Neath from 12 to 10, in Ogmore from 22 to 10, in Pontypridd from 14 to seven, and in the Rhondda valleys from 20 to 11. It would appear, therefore, that in all these towns the additional housing accommodation provided has much more than kept pace with the increase in population. In Merthyr, on the other hand, in 1891 there was overcrowding in 15 per cent. of the tenements with four rooms or less and the same percentage prevailed in 1901. There is thus ample justification for the action of the Merthyr district council in erecting 100 workmen's houses, which are now in course of being built and which will go far to lessen the overcrowding of cottages undoubtedly existing in the town. In the rural districts, some of which, however, are rural only in name, the amount of overcrowding is not so great as it is in the colliery districts, though in only two—Gower and Llandaff—is the percentage less than that found in Cardiff, while in Neath rural district 10 per cent. of the small tenements are overcrowded, and in Cowbridge and Gelligaer rural districts the percentage is eight. In 1901 there were 103,358 men and boys working in the Glamorganshire collieries, a number about equal to 30 per cent. of the male population above 10 years of age, an increase of 3 per cent. upon that recorded in 1891. In the Rhondda valleys and in Merthyr this percentage was 48 and 42 respectively. Among the total number of colliers employed in the whole county only 1572, or about 1½ per cent., were above 65 years of age, and it is of interest to record that in 1901 there were only 84 women stated to be working about the collieries, and these all above ground, while in 1891 there were 299, and in 1881 there were 429 so employed.

Madame Patti at Brecon.

Madame Adelina Patti (Baroness Cederström) gave a concert on Sept. 3rd on behalf of the Brecon County and Borough Infirmary. The large covered market hall of the county town, holding about 2000 persons, was quite filled and Madame Patti was most generous with her encores to each of her four songs. The members of the concert party, which included Mr. Santley and Mr. Wilhelm Ganz all gave their services, but all the other expenses were borne by Madame Patti, so that the infirmary, which was established in 1833 and contains 16 beds, will receive a welcome and substantial addition to its funds.

Memorial to a Newport Medical Practitioner.

It has been decided to erect a drinking fountain in Beechwood Park, Newport, Mon., in memory of Dr. John F. L. Mullin who died in February last after practising in the town for over 10 years. The cost of the memorial is being defrayed by a shilling sub-cription to which the working people of the town have largely contributed.

Vaccination Questions.

At the meeting of the St. Thomas (Exeter) board of guardians held on Sept. 5th a letter was received from the Local Government Board stating that a vaccination officer could take proceedings without the direction of the guardians, whilst the giving of a notice before a visit of the public vaccinator was not necessary to a conviction. The vaccination committee, who had been considering the question of the vaccination fees, recommended that it was desirable to give a month's notice to terminate the contract to the public vaccinators for St. Thomas and Starcross respectively, and the guardians decided to take that course.—At the meeting of the Barnstaple board of guardians held on August 29th it was reported that 474 births were registered in the union during the six months ended December, 1901, and that during the same period 365 children were successfully vaccinated and 29 received certificates of exemption.

Exmouth Cottage Hospital.

The foundation-stone of the Exmouth Cottage Hospital was laid on Sept. 3rd by Lady Gertrude Rolle. The building will contain on the ground floor two main wards, measuring 30 feet by 20 feet, and providing accommodation for six patients each, in addition to which there will be special wards, a surgery, &c. The estimated cost is about £4000, of which £3000 have already been raised.

Sept. 8th.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

Sanitary Association of Scotland.

THE annual congress of the Sanitary Association of Scotland has been held during the past week in the Beveridge Hall, Kirkcaldy, under the presidency of Professor John Glaister, M.D. In his opening address the President discussed the subject of public water-supplies in urban and rural communities, dealing more particularly with the conditions necessary to secure a sufficiency of water and to avoid pollution from various possible sources of contamination. Dr. T. G. Nasmyth, medical officer of health of Fifeshire, read a paper on the pollution of rivers. He dealt particularly with modern methods of sewage purification as bearing on the condition of rivers and streams and criticised the clauses of the Rivers Prevention Pollution Act. This Act, he said, was so cumbrous and so expensive to put into operation that it had practically become a dead-letter. He advocated the erection of a separate commission or special department of the Local Government Board to be the supreme authority in dealing with the pollution and other questions affecting the views of the whole country. In a paper on small-pox hospitals Dr. Alexander Johnston, physician superintendent of Ruchill Hospital, Glasgow, discussed the cost of these institutions to the community and argued that such expense would be unnecessary were vaccination and revaccination efficiently enforced. Quoting from recent experiences in Glasgow he showed that the small-pox hospital in Glasgow in 1898-99, when not a single case was admitted, cost £1300 to maintain, whilst two years later, when 1700 patients were treated, the cost of maintenance rose to nearly £12,000. Dr. Johnston also expressed the opinion that the hospital was a means of spreading infection among the surrounding population and urged that this, as well as the large item of expense, would have been avoided had the local authority

power to enforce adequate prophylactic methods. In a discussion on milk-supplies Professor Glaister argued against Koch's conclusions regarding the non-transmission of bovine tuberculosis to man. His own observations led him to favour a directly opposite view. A question having been raised as to the employment by dairy-keepers of servants suffering from various forms of tuberculosis Professor Glaister said he had no doubt that such conduct could be effectively dealt with by a court of law. The meetings of the congress were well attended and proved in every sense highly successful.

Glasgow Royal Infirmary.

Dr. James Dunlop has resigned his position as assistant physician to the infirmary and Dr. John Henderson has been appointed extra-dispensary physician.

Sept. 9th.

IRELAND.

(FROM OUR OWN CORRESPONDENTS.)

Bicycle Accidents in Dublin.

FATAL bicycle accidents are very frequent in Dublin and its neighbourhood at this season, so that not a week passes without a record of serious injury or death. The wife of an English clergyman was recently killed while cycling on Donnybrook-road. The explanation of the number of these accidents is to be found, firstly, in the fact that the bicycle as a means of locomotion is more popular in Dublin than in any other town of the United Kingdom, not excluding Coventry which may be looked upon as the birthplace of the cycle; and secondly, because the usual laws and regulations have not until quite recently prevailed here. It will surprise English readers of THE LANCET to know that the first announcement that the metropolitan police were about to enforce within the city limits the by-laws in connexion with the use of lamps at night—laws that have been put in practice in England for years—appeared here on July 22nd, 1902. The first prosecution in connexion with this important regulation took place only the other day when two bicyclists were sentenced to pay a nominal fee for travelling in the dark through the city without lamps.

Armagh Fever Hospital.

At a meeting of the Armagh board of guardians held on Sept. 2nd it was reported that several cases of sore-throat had occurred both in the fever hospital and in the workhouse, caused, as the medical officer said, by septic poisoning arising from sewage tanks. The reports of the medical officer and of the architect (with his suggestions to remove the unsanitary conditions) were referred to a committee and it was decided to write to the clerk of the urban council and to find out what sum it would accept for the disposal of the union sewage through the new Armagh sewerage scheme.

Small pox in Belfast.

Belfast is now free from small-pox and the stamping-out of the epidemic is due largely to the efforts of Dr. A. G. Robb, physician to the Fever Hospital, to whom it has been very fairly proposed to grant a bonus of £50 for his arduous duties in connexion with the outbreak.

Extraordinary Floods in Belfast.

Belfast has been visited by an extraordinary heavy rainstorm, which began about 10 o'clock on Tuesday, Sept. 2nd, and continued for about 12 hours, culminating on Wednesday morning in a downpour of really tropical severity, the deluge being accompanied by a strong gale and unusually high tides. This visitation in its effects exceeded anything that has ever occurred before and produced a state of things absolutely unprecedented in the history of Belfast. The low-lying parts of the city and almost all the business parts of the town were so flooded that many of the streets were impassable and quite a Venetian condition was produced in Belfast; an immense deal of injury was done to property and great inconvenience was occasioned. The rainfall for a period of 24 hours was 2·75 inches. Two causes are given for this extraordinary flooding of the city of Belfast—firstly, the torrential and altogether unexampled rainfall and, secondly, the complete failure of the main drainage scheme of Belfast. I am glad to state that a special meeting of the corporation has been called to consider this latter most important matter.

Lisburn Workhouse Hospital.

The Local Government Board has forwarded for the information and consideration of the Lisburn board of guardians a special report which it has received from Dr. E. C. Bigger, its medical inspector, on the condition of the workhouse hospital. The inspector pointed out *inter alia* that there were no convalescent wards, day-rooms, or operating-rooms and that cases were not classified in the hospital for treatment. Both ambulances were old two-wheeled vehicles and the inspector suggested the substitution of four-wheeled machines. The infirmary was not as clean and tidy as it should be. The nursing staff was insufficient, as two day nurses and one night nurse could not carry out all the nursing duties connected with such a large number of patients and, at the same time, supervise the lunatic department and the nursery. One additional qualified nurse should be added. There were two padded cells in the lunatic department which should be removed. Iron bedsteads with wire fittings should be provided for the fever hospital. There were no separate wards for consumptive patients. The report concluded by hoping that the inspector's recommendations would be carefully considered.

The Belfast District Asylum.

At a meeting of the committee of the Belfast Asylum, held on Sept. 8th, a letter having been read from the Richmond Asylum Committee urging upon the Belfast committee that they should join in the movement for the establishment of a central pathological laboratory in Dublin for lunatic asylums, a resolution was passed: "That the committee of the Belfast Asylum are of opinion that psycho- and neuro-pathology can be most efficiently and successfully undertaken in connexion with the pathological department of a recognised college or university, and having regard to such they consider that the requisite pathological investigation for the Belfast Asylum can be satisfactorily performed in their own laboratory, with the coöperation of the Professor of Pathology for Queen's College, whenever external assistance is required." This resolution shows that the Belfast view is entirely against any scheme of centralisation in Dublin. The day for such a scheme is passed.

Sept. 9th.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

The New Director of the Assistance Publique.

THE Ministry has chosen M. Mesureur to replace M. Mourier whose death I announced in my last letter to you. The new Director of the Assistance Publique is a politician who was formerly a Deputy for Paris and also for a short time a Minister. At the last general election he was thrown over by the electors and his nomination is evidently a sort of consolation prize given to him by his political friends, who are, as a fact, masters of the Government. M. Mesureur, who commenced life as a working man, his occupation being that of an embroidery designer, knows absolutely nothing about the various complex questions which arise in regard to the Assistance Publique. The director of this administration ought to be at once a philanthropist, a lynx-eyed administrator, and an excellent man of business. Other men well known for their labours and their aptitude for these matters were proposed for the post, but it was absolutely necessary for the Government to find a good post for a political friend who is well known for his socialistic revolutionary opinions. It is much to be feared that the choice of the Government, which is being met with lively disapprobation by all the medical men and the whole staff of the Assistance Publique in Paris, will do nothing to assist in setting the administration on a sound footing.

Various Congresses.

At the present time congresses are being held everywhere. At Montauban the French Association for the Advancement of Science is in session. At Grenoble there is a Congress of Neurologists, together with another congress, that of Hydrology and Geology. At Grenoble an interesting discussion has been held on the question of *tics*. M. Meige and M. Feindel, who have just written a remarkable book on this question, have laid before the Congress of Neurologists some very instructive views on the matter. M. Meige, together with Professor Brissaud, holds that *tics* are to be distinguished

from spasms in that the motions of the former are co-ordinated, but they are brought about unconsciously and in a purposeless manner. As far as treatment goes M. Meige recommends exercise before a mirror—that is to say, the patient should practise before a mirror by trying to reproduce voluntarily and slowly the motions of the *tic*. When he can do this deliberately and on purpose he may be said to be nearly well. At the Montauban Congress the Section of Hygiene has passed some interesting resolutions with regard to alcoholism, the construction of buildings destined for community life such as lycées and hospitals, and the means of combating tuberculosis.

Sept. 10th.

Medical News.

FOREIGN UNIVERSITY INTELLIGENCE.—*Berlin:* Dr. Nagel of the Physiological Institute has been promoted to an Extraordinary Professorship; *Bologna:* Dr. Antonio Gnudi has been recognised as *privat-docent* of Medical Pathology.—*Breslau:* Dr. Paul Krause has been recognised as *privat-docent* of Internal Medicine.—*Chicago (Harvey Medical College):* Dr. G. E. Krieger, medical inspector of the Chicago Health Department, and formerly assistant in the Würzburg Surgical Clinic, has been appointed to the chair of Surgery.—*Cracow:* Dr. Alex. Rosner, *privat-docent* of Midwifery and Gynæcology, has been promoted to an Extraordinary Professorship.—*Erlangen:* Dr. Heim has been promoted from Extraordinary Professor to Ordinary Professor of Hygiene.—*Freiburg:* Dr. Pertz has been recognised as *privat-docent* of Surgery; Dr. Eduard Jacobi has been given charge of the newly-established chair of Dermatology; Dr. H. Pfister, *privat-docent* of Psychiatry, has been promoted to an Extraordinary Professorship.—*Göttingen:* Dr. Sultan, *privat-docent* of Surgery, has been granted the title of Professor.—*Gratz:* Dr. Wilhelm Scholz has been recognised as *privat docent* of Internal Medicine.—*Lausanne:* Dr. J. Berdez has been appointed Extraordinary Professor of Therapeutics and Materia Medica; Dr. A. Mermod has been appointed Extraordinary Professor of Otology and Laryngology.—*Leipsic:* Dr. F. Saxer has been appointed Extraordinary Professor of Pathological Anatomy.—*Marburg:* Dr. Heinrich Hildebrand of Hamburg has been appointed to an Extraordinary Professorship.—*Moscow:* Dr. Maliutin has been recognised as *privat-docent* of Otology and Laryngology.—*Munich:* Professor Max Gruber of Vienna has, in spite of the efforts of the Austrian authorities to retain his services, decided to accept the chair of Otology; Dr. Siegfried Mollier has been promoted to an Ordinary Professorship of Anatomy; Professor Fritz Voit has taken over charge of the University Medical Policlinic in place of Professor Moritz who has gone to Greifswald.—*Naples:* Dr. Giovanni Velo has been recognised as *privat-docent* of Operative Medicine.—*Paris:* Dr. Gaucher of the St. Antoine Hospital has been appointed to the chair of Dermatology and Syphilis in succession to M. Fournier.—*Prague (German University):* Dr. Hering has been promoted to be Ordinary Professor of Experimental Pathology.—*Pavia:* Dr. Emilio Veratti has been recognised as *privat-docent* of Histology.—*St. Petersburg (Military Medical Academy):* Dr. P. Avroroff has been recognised as *privat-docent* of General Pathology.—Dr. Vinogradski has been appointed Director of the Institute for Experimental Medicine.—*Warsaw:* Dr. Cherniakovski of Kieff has been recognised as *privat-docent* of Surgery.

SUDDEN DEATHS OF TWO MEDICAL MEN.—Dr. C. T. Aveling of Stamford-hill, London, after cycling on Sept. 5th, was bathing at Mullion, Cornwall. A young lady who was bathing near him cried out for help and Dr. Aveling promptly went to her assistance. Before he reached her and when not out of his depth he sank, it is supposed, from syncope. He was brought in at once by another visitor but life was then extinct. Dr. Aveling had been an annual visitor at Mullion for some years. He was of a genial temperament and was very popular in the little village where much sympathy is felt with his widow and children.—Mr. Frederick Pratt of Appledore, North Devon, died suddenly whilst visiting a patient on Sept. 3rd. The deceased received his medical education at St. Bartholomew's Hospital and qualified as M.R.C.S. Eng. and L.S.A. in 1851. He was attached to the Highland Brigade during the Crimean war and received the Crimean medal and clasp; he was also awarded the Turkish medal. Mr. Pratt succeeded to his father's practice at Appledore, being one of six sons who were all medical men. The deceased, who was 75 years of age, had been for many years medical officer of health of the Northam district and Trinity surgeon to Lundy Island.

THE Barnstaple friendly societies have just raised over £150 for the North Devon Infirmary and Dispensary.

PRESENTATIONS TO MEDICAL PRACTITIONERS.—At Negapatam, South India, on August 14th, Mr. H. W. M'Caully Hayes, M.R.C.P., L.R.C.S. Edin., L.F.P.S. Glasg., and L.M., was presented with a gold signet ring by the members of the St. John Ambulance Association class in token of their appreciation of his services as lecturer to the class.

DIFFICULTIES UNDER THE NOTIFICATION ACT.—We have been requested by the honorary secretary of the Birmingham and District General Medical Practitioners' Union to publish the following resolution which was passed unanimously at a meeting of the union held on Sept. 4th:—

> That this council considers that the arrangement made by the health committee for one of the medical superintendents of the City Hospital to visit all patients reported to be suffering from chicken-pox who are over seven years old is an unwarrantable interference with the liberty of the patient and contrary to the practice of the profession; that this action is both unnecessary and improper and should not be undertaken except at the request of, and in consultation with, the practitioner in attendance; and further that the remarks published in reference to the instance in which it is alleged that no less than six persons in one house were mistakenly treated as suffering from small-pox are libellous, unfair, and altogether unjustifiable.

A CENTENARIAN.—Mrs. Macqueeney, *née* Livingstone, a cousin of Dr. David Livingstone, the African explorer, has now reached the age of 107 years. She is living at Fishnish, Isle of Mull, under the care of Mrs. Fletcher of Glenaros, with whom she was for long a servant. She is feeble and her hearing, which was not good seven years ago, is now completely gone. Her memory began to fail many years ago. Dr. Livingstone, on the occasion of one of his visits to Mull, presented her with a silver brooch, on which her name was inscribed. When she was about 35 years of age she married an Irish soldier named Macqueeney. Their married life only lasted about four years and their one daughter, now aged 70 years, resides in Glasgow.

LORD GREY'S PUBLIC HOUSE TRUST.—The active support afforded to this movement in all parts of the kingdom has resulted in the placing in the hands of Lord Grey's Local Trust Companies 35 public-houses, of which the majority are already opened. In addition to these the People's Refreshment House Association (the pioneer of the movement), of which the Bishop of Chester is president, has acquired 25 houses. Of these 60 houses all except six have been taken since 1900. During the next few weeks prospectuses will be issued for additional trust companies for Manchester, Salford and district, Bradford, and the counties of Middlesex, Derbyshire, Cheshire, Carnarvonshire, and Staffordshire. Those interested in the movement can obtain all information concerning it from the Central Association's Offices at 116, Victoria-street, S.W.

Appointments.

Successful applicants for Vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward it to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, for publication in the next number.*

DUNCAN, WILLIAM, M.B., C.M. Glasg., has been appointed Certifying Surgeon under the Factory Act for the Clay Cross District of Derbyshire.

DWYER, HUBERT DE BURGH, M.R.C.S. Eng., L.R.C.P. Lond., has been appointed Medical Officer to the Banbury Union Workhouse Infirmary, vice H. J. Edwards, resigned.

EATON, OLIVER, L.R.C.P., M.R.C.S., D.P.H. Cantab., has been appointed Public Vaccinator for Exmouth (Devon).

GARLAND, EDWARD CHARLES, M.R.C.S., L.R.C.P. Edin., L.S.A., has been re-appointed Medical Officer of Health for Yeovil.

GIBBS, NORMAN EDWARD, L.R.C.P., L.R.C.S. Edin., L.F.P.S. Glasg., has been appointed House Surgeon to the West Kent General Hospital, vice C. J. I. Krumbholz, M.B., resigned.

KIRBY, SAMUEL J. J., M.D, Brussels, has been appointed Medical Officer of Health of the Hoxne Rural District.

MACFIE, RONALD CAMPBELL, M.B., C.M. Aberd., has been appointed Medical Superintendent of Dundee Sanatorium.

MORRISSEY, MARTIN R., L.R.C.P., L.R.C.S. Edin., L.F.P.S. Glasg., has been appointed Certifying Surgeon under the Factory Act for the Ballymore Eustace District of the county of Kildare.

MURPHY, W. E. CAVANAGH, M.B., B.Ch. Dubl., has been re-appointed Medical Officer of Health for the Llantarnam (Mon.) Urban District Council.

O'HAGAN, PATRICK F., L.R.C.P., L.R.C.S. Edin., L.F.P.S. Glasg., has been appointed Certifying Surgeon under the Factory Act for the Croydon District of Surrey.

PEACOCK, PRYCE, M.B. Brussels, has been appointed Certifying Surgeon under the Factory Act for the Castleknock District of the county of Dublin.

SEQUEIRA, JAMES H., M.D. Lond., M.R.C.P. Lond., F.R.C.S. Eng., has been appointed Assistant Physician to the Skin Department of the London Hospital.

SHARP, EDGAR WM., M.B., Ch.B. Glasg., has been appointed Resident Medical Officer to the Halifax Workhouse Infirmary.

SMITH, LEWIS A., M.D., M.R.C.P. has been appointed Assistant Physician to the London Hospital.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

BIRKENHEAD BOROUGH HOSPITAL.—Junior Male House Surgeon. Salary £80 per annum, with board and washing.

BIRMINGHAM GENERAL HOSPITAL.—Dental Surgeon. Honorarium £50 per annum.

BLACKBURN AND EAST LANCASHIRE INFIRMARY.—Junior House Surgeon. Salary £70 per annum, with board, washing, &c.

BRADFORD POOR-LAW UNION HOSPITAL AND WORKHOUSE.—Resident Assistant Medical Officer, unmarried. Salary £125, with rations, apartments, and washing.

BRISTOL GENERAL HOSPITAL.—Assistant Casualty House Surgeon. Salary £70, with board, residence, &c.

BURY INFIRMARY.—Senior House Surgeon. Salary £110, with board, residence, and attendance.

CAMBERWELL HOUSE ASYLUM.—Second Assistant Medical Officer, unmarried. Salary £150 per annum, with board, rooms, and laundry.

CANCER HOSPITAL, London.—Pathologist. Salary £250 per annum.

CENTRAL LONDON OPHTHALMIC HOSPITAL, Gray's Inn-road, W.C.—House Surgeon.

CORNWALL COUNTY ASYLUM, Bodmin.—Junior Assistant Medical Officer, unmarried. Salary £130, rising to £160, with board, apartments, laundry, &c.

DENBIGHSHIRE INFIRMARY, Denbigh.—House Surgeon. Salary £100, with board, residence, and washing.

DERBYSHIRE ROYAL INFIRMARY.—Honorary Physician.

EAST SUSSEX NEW LUNATIC ASYLUM.—Medical Superintendent. Salary £900 a year, with unfurnished house, &c.

HITCHIN (NEAR) THREE COUNTIES ASYLUM.—Second Assistant Medical Officer, unmarried. Salary £150 per annum, with board, apartments, washing, and attendance.

LEICESTER INFIRMARY.—Assistant House Surgeon. Salary £80 per annum, with board, apartments, and washing.

LIVERPOOL, CITY OF, INFECTIOUS DISEASES HOSPITALS.—Assistant Resident Medical Officer, unmarried. Salary £120 per annum, with board, washing, and lodging.

LIVERPOOL COUNTY ASYLUM, Rainhill.—Assistant Medical Officer, unmarried. Salary £150 per annum, rising to £250, with further increase to £350 on promotion, with apartments, board, attendance, and washing.

LIVERPOOL DAVID LEWIS NORTHERN HOSPITAL.—Assistant House Surgeon. Salary £70 per annum, with residence and maintenance.

MIDDLESBOROUGH, NORTH RIDING INFIRMARY.—House Surgeon, unmarried. Salary £100 per annum, with board, lodging, and washing.

MORPETH DISPENSARY.—House Surgeon, unmarried. Salary £120 per annum, with rooms and attendance.

NORTHAMPTON COUNTY BOROUGH.—Medical Officer of Health. Salary £500 per annum.

NORTH-EASTERN HOSPITAL FOR CHILDREN, Hackney-road, N.E.—Resident Medical Officer. Salary £120 per annum, with board, residence, and washing.

NOTTINGHAM CHILDREN'S HOSPITAL, Forest House,—House Surgeon (unmarried) for six months. Salary at the rate of £100, with board and residence.

READING ROYAL BERKSHIRE HOSPITAL.—Assistant House Surgeon. Salary £50 per annum, with board, lodging, and washing.

ROXBURGH DISTRICT ASYLUM, Melrose, N.B.—Assistant Medical Officer. Salary £140 per annum, with board, rooms, and washing.

ROYAL FREE HOSPITAL, Gray's Inn-road, London, W.C.—Physician; also Assistant Physician for Diseases of Women.

ROYAL SURREY COUNTY HOSPITAL, Guildford.—Assistant House Surgeon. Salary £75, with board, residence, and laundry.

ST. MARK'S HOSPITAL FOR FISTULA AND OTHER DISEASES OF THE RECTUM, City-road, London, E.C.—House Surgeon. Salary £80 per annum, with board, lodging, and washing.

ST. MARY'S HOSPITAL, Paddington, W.—Surgeon for Diseases of the Skin.

ST. PAUL'S HOSPITAL FOR SKIN AND GENITO-URINARY DISEASES, Red Lion-square, W.C.—Clinical Assistant, also Honorary Anæsthetist.

ST. PETER'S HOSPITAL FOR STONE, ETC., Henrietta-street, Covent-garden, W.C.—House Surgeon for six months. Salary at rate of £100 a year, with board, lodging, and washing.

ST. THOMAS'S HOSPITAL AND MEDICAL SCHOOL.—Assistant Pathologist and Demonstrator of Pathology. Salary £250 per annum.

SALISBURY GENERAL INFIRMARY.—Assistant House Surgeon, unmarried. Salary at rate of £75 per annum, with apartments, board, and washing.

SHEFFIELD, CITY OF, HOSPITALS FOR THE TREATMENT OF CASES OF INFECTIOUS DISEASE.—Second Assistant Medical Officer. Salary £150 per annum, with board, lodging, and attendance.

STOCKPORT INFIRMARY.—Junior Assistant House Surgeon for six months. Salary at rate of £40 per annum, with board, washing, and residence.

VICTORIA HOSPITAL FOR CHILDREN, Tite-street, Chelsea, S.W.—House Surgeon for six months. Honorarium of £25, with board and lodging.

WESTMINSTER HOSPITAL. Assistant Pathologist and Curator. Salary 100 guineas a year.

WESTON-SUPER-MARE HOSPITAL AND DISPENSARY.—Medical Officer to the Provident Dispensary. Salary £100 per annum, with board, lodging, and washing.

WILLITON UNION, Somerset.—Medical Officer and Public Vaccinator. Salary £80 per annum, with fees.

WITHINGTON URBAN DISTRICT COUNCIL HOSPITAL FOR INFECTIOUS DISEASES.—Resident Medical Officer (unmarried) for the Baguley Sanatorium. Salary £120 per annum, with board, apartments, washing, and attendance.

WONFORD HOUSE HOSPITAL FOR THE INSANE, Exeter.—Assistant Medical Officer, unmarried. Salary £150 per annum, rising to £200, with board, &c.

YORK DISPENSARY.—Resident Medical Officer, unmarried. Salary £110 a year, with board, lodging, and attendance.

THE Chief Inspector of Factories, Home Office, London, S.W., gives notice that vacancies as Certifying Surgeons under the Factory Act exist at Truro and at Winsford.

Births, Marriages, and Deaths.

BIRTHS.

ARKWRIGHT.—On Sept. 5th, at Halesowen, the wife of Joseph A. Arkwright, M.D., of a daughter.

LUCY.—On Sept. 6th, at The Crescent, Plymouth, the wife of Reginald H. Lucy, M.B., F.R.C.S., of a son.

MELLISH.—On Sept. 1st, at Coombe House, Tetbury, Gloucestershire, the wife of J. Stafford Mellish, M.R.C.S., L.R.C.P., of a daughter.

SMITH.—On Sept. 6th, at Earl's-court-road, South Kensington, the wife of P. Montague Smith, M.R.C.S. Eng., L.R.C.P. Lond., of a son.

MARRIAGES.

BARRY—DE COURCY-IRELAND.—On Sept. 9th, at Christ Church, Ealing, W., by the Right Rev. Alfred Barry, D.D., Assistant Bishop of London, Captain Cecil Stuart Barry, I.M.S., to Dorothea Alice Maud, second daughter of the late W. de Courcy-Ireland.

FISHER—GORMAN.—On Sept. 4th, at St. James's parish church, Paddington, by the Rev. J. M. L. Evans, Herbert Wortley Fisher, M.R.C.S., L.R.C.P., to Aileen, daughter of Lieutenant-Colonel W. J. Gorman (retired).

FOX—LEWIS.—On Sept. 3rd, at All Souls', Langham-place, by the Rev. A. C. Fox uncle of the bridegroom, Campbell Tilbury Fox, M.R.C.S. Eng., L.R.C.P. Lond., of Ashford, Kent, son of the late Tilbury Fox, M.D., F.R.C.P., to Hilda Lewis, of Seaham Harbour, co. Durham, daughter of A. Lewis, Esq.

HORDER—DOGGETT.—On Sept. 3rd, at the parish church, Newnham, Herts, by the Rev. G. Todd, vicar, and the Rev. J. T. Inskip, vicar of Leyton, Essex, Thomas Jeeves Horder, M.D. Lond., M.R.C.P., &c., 141, Harley-street, W., youngest son of the late Albert Horder, Wincombe, Swindon, to Geraldine Rose, only daughter of Arthur Doggett, Esq., of Newnham Manor, Baldock, Herts.

JAMESON-EVANS - EDWARDS.—On Sept. 3rd, at St. Columba's Presbyterian Church, Cambridge, by the Rev. Llewelyn Edwards, M.A. London, uncle of the bride, assisted by the Rev. D. Treberth Jones, Cambridge brother-in-law of the bride, John Jameson-Evans, M.B., F.R.C.S., Birmingham, only son of Benjamin Evans, Scythlyn, Penceader, to Leta Charles, younger daughter of the late Rev. Thomas Charles Edwards, D.D., Principal of the Theological College, Bala.

KIRTON—SIMMONDS.—On Wednesday, Sept. 3rd, at S. Peter's, Kirkley, Lowestoft, Reginald Gower Kirton, M.D., eldest surviving son of the Rev. Charles Kirton, B.A., of Southwold, Suffolk, to Agnes Mary (Nellie) daughter of Christopher Simmonds, Esq.

TUKE—BOYD.—On August 4th, at Rawal Pindi, India, by the Rev. Mr Slade, Captain Arthur William Tuke, I.M.S., to Anna, daughter of the late John Boyd.

WALTON—RHODES.—On July 26th, at Elandsfontein, South Africa, Captain Henry Beckles Gall Walton, R.A.M.C., to Florence Adela, daughter of the late Charles Rhodes, M.D.

WISE—DARBY.—On Sept. 10th, at St. Mary's, Hornsey-rise, by the Rev. Henry Scott Holland, Robert Wise, M.D., to Adelina Ida, daughter of A. G. Darby.

DEATHS.

ASHLEY.—On Sept. 3rd, at Sion-hill, Clifton, Bristol, Ambrose Humphreys Ashley, M.R.C.S., &c., late H.E.I.C.S., aged 87 years.

AVELING.—On Sept. 5th, at Mullion, Cornwall, Charles Taylor Aveling, M.S., M.D. Lond., F.R.C.S., aged 58 years.

GRANT.—On Sept. 2nd, at Ninnage Lodge, Westbury-on-Severn, Henry Saunders Grant, M.R.C.S., aged 76.

NICOLL.—On August 31st, at Delabole, Cornwall, William A. S. Nicoll, M.B. and C.M., of Jamaica, West Indies, aged 54.

POMERY.—On Sept. 2nd, at Bitterne, Southampton, James Robert Moriarty Pomery, M.R.C.S., aged 76.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Short Comments, and Answers to Correspondents.

A QUESTION OF FEES.

To the Editors of THE LANCET.

SIRS,—I should like your opinion on the following. I was asked to attend an elderly woman in the town in which I reside by a certain individual and did so. After her death I was again asked to render my account and along with other charges it was sent to her son who is a medical man in the States of America. He, writing in return to the individual, says it is not the proper thing for one doctor to render an account to another in such a case. Was I doing the right thing in sending my bill?

I am, Sirs, yours faithfully,

T. W.

*** The fee should be paid. The person calling in our correspondent was liable for the fee and the account was rendered to him.—ED. L.

A WATERLESS URINAL.

WE have received a communication from Mr. J. T. Szek, of 12, Montague-place, Russell-square, London, W.C., in which he proposes to do away with the water flushing of urinals. He suggests the introduction of a slab in the urinal composed of a porous substance and saturated with an antiseptic such as carbolic acid or its homologues. He has submitted a specimen of the porous slab suggested and the disinfectant oil with which it is saturated. The proposal raises several important sanitary points. Of course, the method suggested neglects the idea that microbes should do the work of destruction and purification since the disinfectant slab is intended to sterilize the urine. On the other hand, there is no doubt that water carriage in the case of urine favours fermentation and putrefaction. It is a common experience that however well a urinal may be flushed with water it is more or less offensive.

DETAILED MEDICAL ACCOUNTS.

To the Editors of THE LANCET.

SIRS,—Patients naturally like to know something of the rate at which they are being charged, so I frequently, especially with new patients, add in brackets a little detail—e.g., [60 Ordinary Vts., £7 10s.; 2 Special Vts., 7s. 6d.; Extra Med., 4s. 6d.]; also, where I think it necessary, the note, "A Vt. to 2 patients = 1½ Vt." This plan is only suitable in practices where medicine is not charged for except when excessive in quantity or when supplied apart from visits.

I am, Sirs, yours faithfully,

Woolwich Common, Sept. 8th, 1902. THEODORE MAXWELL.

THE RELIEF OF A RUPTURE.

To the Editors of THE LANCET.

SIRS,—Some years ago I got a severe attack of bronchitis—at Nice of all places. This was followed by a bronchial cough, from which ultimately developed a very prominent hernia in the right inguinal region; in fact, it seemed to me there must be two openings. I immediately went to the best surgical instrument maker I could find, was carefully examined, had a truss, and as that proved of no use I had another. But as both failed to keep up the hernia I said to the man, "Is this all you can do for me?" and he was sorry to say it was, as he knew of nothing else. For a year I bore this inconvenience and irritation with what patience I could; and the worst of it was that sometimes, after a fit of coughing, I was seized with pain all over the front of the abdomen. I never could quite make this out, it was evidently connected in some way with the hernia, as it has now disappeared. I determined at last to take the matter into my own hands to see what I could do for myself. I am not going to weary you or your readers with a detail of all the score of experiments I made with different materials, &c., but I will tell such sufferers at once what I did and what I advise them to do. Take a piece of the heaviest sheet-lead, say about three inches square, and cut it with a pair of scissors until it fits exactly into the space which you wish to be supported. This, of course, must be very carefully and accurately done. Then, when you have got the piece perfectly adapted to the curves of the groin and the scrotum, let it be your model. Now take another piece of the sheet-lead—say, four inches square or so—and bevel the edges beyond your model to make all smooth. The lead is so pliable that you can bulge it and make it of any size you like. Then cut off half the pad of the truss longways and diagonally so that the pressure may be exactly where you want it. When you are satisfied with its position on your leaden shield fasten it with a little diamond cement, and when dry fold the surplus part of the lead over the edges of the truss and its narrower part so as to keep all firm and secure; cover the under surface and the edges with imitation Astrachan fur, also gummed on, and then your protecting-pad should be about two and a half inches square or so, but really pear-shaped. The thigh strap must, of course, go on the opposite side, and when both straps are properly fixed you will see at once that when the pad is duly pressed against the scrotum nothing can possibly escape—the hernia is absolutely under control. To me the relief was astonishing; it was both immediate and complete, while the spasmodic attacks of pain entirely disappeared. All I can say is that if any of your readers experiences the same relief he will thank me all the days of his life. It may be that this little simple plan may be known to others but it was not to me. A small silk pocket-handkerchief may be also put under the pad if need be and the whole worn over the vest. By easing the straps I found it very comfortable for night wear. I found Burroughs and Wellcome's hazeline cream very useful in relieving the irritation caused by my experiments and also most valuable was a prescription of a celebrated Berlin physician: one-third zinc ointment, one-third powdered starch, and one-third salicylate of soda. I may observe that a bad case of eczema was cured by this in Gloucestershire which had resisted all other treatment. You have my name and address and if any of your readers require any further information, which I think is scarcely necessary, I shall be glad to give it.

I am, Sirs, yours faithfully,

August 30th, 1902. M.D.

"OBJECTIONABLE ADVERTISEMENTS."—"THE ENGLISH ILLUSTRATED MAGAZINE."

To the Editors of THE LANCET.

SIRS,—In reply to your correspondent's note in THE LANCET of Sept. 6th, p. 719, my attention was drawn last month to certain advertisements in the *English Illustrated Magazine*. I immediately gave orders that they should not appear again, and they are not in the current issue which was published by me on Aug. 26th.

I am, Sirs, yours faithfully,

Sept. 9th, 1901. T. FISHER UNWIN.

*** Mr. T. Fisher Unwin's action is only what we should have expected from a publisher of his standing.—ED. L.

THE TREATMENT OF ASTHMA.

To the Editors of THE LANCET.

SIRS,—In reply to the inquiry of "Rusticus" in THE LANCET of Sept. 6th (p. 720), I would say that Messrs. Oppenheimer and Son have, in their Nebuline Compound No. 19 an almost exactly similar preparation to the so-called "Tucker's Remedy for Asthma." The compound can be used with either Oppenheimer's "Nebuliser" or "Aeriser" and will be found most effectual in affording relief.

I am, Sirs, yours faithfully,

WILLIAM ODELL, M.D. Durh., F.R.C.S. Eng.

Torquay, Sept. 6th, 1902.

THE HUMOURS OF CONSCIENTIOUS OBJECTION.

AT the North London police-court on Sept. 3rd a respectably dressed man, who said that he was a traveller, asked Mr. D'Eyncourt for a certificate exempting his child from vaccination. He said: "I conscientiously believe that vaccination would be prudential to the health of my child."—Mr. D'Eyncourt: "What do you say, prudential? Surely you do not mean that?"—The Applicant (in some confusion): "I can't think of the word."—On the advice of the magistrate he sat down to think the matter over and presently returning to the witness-box he said: "I conscientiously believe that vaccination would be prejudicial to the health of my child."—Mr. D'Eyncourt: "That is what you intended to say before, I suppose?"—The Applicant: "Yes."—Mr. D'Eyncourt: "Very well; by law you are entitled to have the certificate and you may take it." Another applicant is reported as asking for an exemption certificate for a child on the ground that he believed "vaccination to be judicial to my health."

ALIQUANDO DORMITAT HOMERUS.

THE following is from the September number of the London *Polyclinic*:—

A BOOKSELLER'S BLUNDER.—We have all heard of the sufferer from podagra who purchased a French treatise on Gout in the hope of finding the newest knowledge as to his enemy. His blunder has, however, been capped by a Reading bookseller, who prints in a catalogue with which he has just favoured us, the following:—

770 MEDICAL.—The Anatomy of the Kebla, or a Dissection of the Defence of Eastward Adoration, lately published by J. Andrews, Vicar of South Newington, in Oxfordshire, sm. 8vo. *bf. brown mor.*, 3s. 6d. 17/9

THE DUTIES OF A LADY SUPERINTENDENT.

To the Editors of THE LANCET.

SIRS,—You will, I think, agree that the following resolution passed by the board of management here a fortnight ago should be read by any intending applicant for the post of house surgeon to the hospital: "That the lady superintendent be given to understand in cases which she believes the house surgeon is not properly carrying out the instructions of the honorary medical staff that it is her duty to report such case at once to the board through the chairman."

I am, Sirs, yours faithfully,

JAMES CAMPBELL, M.B., Ch.B. Aberd., House Surgeon.

Children's Hospital, Nottingham, Sept. 9th, 1902.

MR. F. W. WATERS writes to say that he has sent in his resignation of the post of medical officer of the Sheerness Medical Benefit Society

He would be glad if any person thinking of applying for the appointment would write to him first. The rate of subscription is a halfpenny a week and out of that the medical officer has to find drugs, splints, instruments, bandages, the rent, rates, and taxes of a surgery, together with the pay of a dispenser and a boy.

A CORRESPONDENT who writes from Inglebank, Barker's-lane, Ashton-on-Mersey, has omitted to sign his letter or to inclose his card.

Rufus.—Our correspondent is, we think, at liberty to call himself "Doctor." He must, however, not use the title officially—e.g., he must not sign a death certificate as "Rufus, M.D."—but must use his registered qualification.

During the week marked copies of the following newspapers have been received :—*Buxton Herald, Referee, Nenagh Guardian, Labour Leader, Imperial Review, Register (Adelaide), Oban Telegraph, Engineer, Surrey Advertiser, Umpire, Hertfordshire Mercury, Fife Herald, Isle of Wight Herald, Preston Guardian, Yorkshire Post, Yorkshire Daily Observer, &c.*

METEOROLOGICAL READINGS

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Sept. 11th, 1902.

Date	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Rainfall.	Solar Radiation in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks at 8.30 A.M.
Sept. 5	30·00	N.W.	...	108	70	56	57	59	Hazy
,, 6	30·08	NNW	...	109	74	57	57	59	Hazy
,, 7	30·18	W.	...	103	71	54	57	60	Fine
,, 8	30·23	WNW	...	110	72	53	54	57	Hazy
,, 9	30·04	SSE	...	109	72	55	59	62	Fine
,, 10	29·97	E.	...	92	68	59	60	62	Dull
,, 11	29·84	S.E.	0·45	76	65	59	60	62	Overcast

Medical Diary for the ensuing Week.

OPERATIONS.

METROPOLITAN HOSPITALS.

MONDAY (15th).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), St. George's (2 P.M.), St. Mary's (2.30 P.M.), Middlesex (1.30 P.M.), Westminster (2 P.M.), Chelsea (2 P.M.), Samaritan (Gynæcological, by Physicians, 2 P.M.), Soho-square (2 P.M.), Royal Orthopædic (2 P.M.), City Orthopædic (4 P.M.), Gt. Northern Central (2.30 P.M.) West London (2.30 P.M.), London Throat (9.30 A.M.), Royal Free (2 P.M.), Guy's (1.30 P.M.).

TUESDAY (16th).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), Guy's (1.30 P.M.), Middlesex (1.30 P.M.), Westminster (2 P.M.), West London (2.30 P.M.), University College (2 P.M.), St. George's (1 P.M.), St. Mary's (1 P.M.), St. Mark's (2.30 P.M.), Cancer (2 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Royal Ear (3 P.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square (9.30 A.M.), Soho-square (2 P.M.).

WEDNESDAY (17th).—St. Bartholomew's (1.30 P.M.), University College (2 P.M.), Royal Free (2 P.M.), Middlesex (1.30 P.M.), Charing-cross (3 P.M.), St. Thomas's (2 P.M.), London (2 P.M.), King's College (2 P.M.), St. George's (Ophthalmic, 1 P.M.), St. Mary's (2 P.M.), National Orthopædic (10 A.M.), St. Peter's (2 P.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Gt. Ormond-street (9.30 A.M.), Gt. Northern Central (2.30 P.M.), Westminster (2 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), Cancer (2 P.M.), Throat, Golden-square (9.30 A.M.), Guy's (1.30 P.M.).

THURSDAY (18th).—St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), University College (2 P.M.), Charing-cross (3 P.M.), St. George's (1 P.M.), London (2 P.M.), King's College (2 P.M.), Middlesex (1.30 P.M.), St. Mary's (2.30 P.M.), Soho-square (2 P.M.), North-West London (2 P.M.), Chelsea (2 P.M.), Gt. Northern Central (Gynæcological, 2.30 P.M.), Metropolitan (2.30 P.M.), London Throat (9.30 A.M.), St. Mark's (2 P.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat Golden-square (9.30 A.M.), Guy's (1.30 P.M.).

FRIDAY (19th).—London (2 P.M.), St. Bartholomew's (1.30 P.M.), St. Thomas's (3.30 P.M.), Guy's (1.30 P.M.), Middlesex (1.30 P.M.), Charing-cross (3 P.M.), St. George's (1 P.M.), King's College (2 P.M.), St. Mary's (2 P.M.), Ophthalmic (10 A.M.), Cancer (2 P.M.), Chelsea (2 P.M.), Gt. Northern Central (2.30 P.M.), West London (2.30 P.M.), London Throat (9.30 A.M.), Samaritan (9.30 A.M. and 2.30 P.M.), Throat, Golden-square, (9.30 A.M.), City Orthopædic (2.30 P.M.), Soho-square (2 P.M.).

SATURDAY (20th).—Royal Free (9 A.M.), London (2 P.M.), Middlesex (1.30 P.M.), St. Thomas's (2 P.M.), University College (9.15 A.M.), Charing-cross (2 P.M.), St. George's (1 P.M.), St. Mary's (10 P.M.), Throat, Golden-square (9.30 A.M.,, Guy's (1.30 P.M.).

At the Royal Eye Hospital (2 P.M.), the Royal London Ophthalmic (10 A.M.), the Royal Westminster Ophthalmic (1.30 P.M.), and the Central London Ophthalmic Hospitals operations are performed daily

LECTURES, ADDRESSES, DEMONSTRATIONS, &c

MONDAY (15th).—MEDICAL GRADUATES' COLLEGE AND POLYCLINIC (22, Chenies-street, W.C.).—4 P.M. Dr. J. Galloway: Clinique. (Skin.)

TUESDAY (16th).—MEDICAL GRADUATES' COLLEGE AND POLYCLINIC (22, Chenies-street, W.C.).—4 P.M. Dr. C. O. Hawthorne: Clinique. (Medical.)

WEDNESDAY (17th).—MEDICAL GRADUATES' COLLEGE AND POLYCLINIC (22, Chenies-street, W.C.).—4 P.M. Mr. R. Harrison: Clinique. (Surgical.)

THURSDAY (18th).—MEDICAL GRADUATES' COLLEGE AND POLYCLINIC (22, Chenies-street, W.C.).—4 P.M. Mr. Hutchinson: Clinique. (Surgical.)

FRIDAY (19th).—MEDICAL GRADUATES' COLLEGE AND POLYCLINIC (22, Chenies-street, W.C.).—4 P.M. Mr. R. Lake: Clinique. (Ear.)

EDITORIAL NOTICES.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITORS," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this Office.

Lectures, original articles, and reports should be written on one side of the paper only, AND WHEN ACCOMPANIED BY BLOCKS IT IS REQUESTED THAT THE NAME OF THE AUTHOR, AND IF POSSIBLE OF THE ARTICLE, SHOULD BE WRITTEN ON THE BLOCKS TO FACILITATE IDENTIFICATION.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers—not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale, and advertising departments of THE LANCET *should be addressed "To the Manager."*

We cannot undertake to return MSS. not used.

MANAGER'S NOTICES.

TO SUBSCRIBERS.

WILL Subscribers please note that only those subscriptions which are sent direct to the Proprietors of THE LANCET at their Offices, 423, Strand, W.C., are dealt with by them? Subscriptions paid to London or to local newsagents (with none of whom have the Proprietors any connexion whatever) do not reach THE LANCET Offices, and consequently inquiries concerning missing copies, &c., should be sent to the Agent to whom the subscription is paid and *not* to THE LANCET Offices.

Subscribers, by sending their subscriptions direct to THE LANCET Offices, will ensure regularity in the despatch of their Journals and an earlier delivery than the majority of Agents are able to effect.

The rates of subscriptions, post free, either from THE LANCET Offices or from Agents, are :—

FOR THE UNITED KINGDOM.		TO THE COLONIES AND ABROAD.	
One Year	£1 12 6	One Year	£1 14 8
Six Months	0 16 3	Six Months	0 17 4
Three Months	0 8 2	Three Months	0 8 8

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